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# ENVIRONMENTAL ASSESSMENT BOARD



## ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

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VOLUME: 148

DATE: Tuesday, May 19, 1992

BEFORE:


|                              |          |
|------------------------------|----------|
| HON. MR. JUSTICE E. SAUNDERS | Chairman |
| DR. G. CONNELL               | Member   |
| MS. G. PATTERSON             | Member   |

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ENVIRONMENTAL ASSESSMENT BOARD  
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act,  
R.S.O. 1980, c. 140, as amended, and Regulations  
thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro  
consisting of a program in respect of activities  
associated with meeting future electricity  
requirements in Ontario.

Held on the 5th Floor, 2200  
Yonge Street, Toronto, Ontario,  
Tuesday, the 19th day of May,  
1992, commencing at 10:00 a.m.

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VOLUME 148  
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B E F O R E :

|                                  |          |
|----------------------------------|----------|
| THE HON. MR. JUSTICE E. SAUNDERS | Chairman |
| DR. G. CONNELL                   | Member   |
| MS. G. PATTERSON                 | Member   |

S T A F F :

|                 |   |
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A P P E A R A N C E S

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| L. CHAN      | ) |   |
| R. MATSUI    | ) |   |



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1 ---Upon commencing at 10:03 a.m.

2 THE REGISTRAR: Please come to order.  
3 This hearing is now in session.

4 THE CHAIRMAN: I want to put on record,  
5 just before I forget, that the Hydro overheads for  
6 Panel 10 have been filed and have been given the  
7 number, Exhibit 682.

8 ---EXHIBIT NO. 682: Overheads in support of Panel 10.

9 THE CHAIRMAN: Mr. Campbell.

10 MR. B. CAMPBELL: Thank you, Mr.  
11 Chairman. I would like to introduce the panel to you.  
12 Sitting farthest from the Board is Dr. Fred Long, Dr.  
13 Long is manager, long-term financial planning  
14 department, corporate financial planning and reporting  
15 division, and that is within the finance branch at  
16 Ontario Hydro.

17 Sitting next to Dr. Long is a familiar  
18 face Mr. Shalaby, Amir Shalaby. He is co-ordinator,  
19 Demand/Supply Plan review, just to remind you of his  
20 title. And about the time of the Update, there was  
21 some corporate restructuring at Ontario Hydro and I  
22 should probably note that that position is now part of  
23 the corporate programming division in the environment  
24 and corporate programming branch.

25 I should advise the Board that the sets

1 of overheads were sent out by same day courier Friday.  
2 Obviously they didn't all get there, and we only had a  
3 limited number of additional copies. But they have  
4 gone out to all parties who filed statements of  
5 concerns and they were sent Friday, same day courier.

6 THE CHAIRMAN: I think if there are  
7 people here who haven't got them, I think we should  
8 make some arrangements to get them for them because I  
9 think it would be very difficult, at least the previous  
10 panels, to follow the evidence without them.

11 MR. B. CAMPBELL: Well, we better get --

12 THE CHAIRMAN: As a matter of fact who  
13 here has not got a copy and would like one.

14 --- (Indication by hands)

15 THE CHAIRMAN: 12.

16 MR. B. CAMPBELL: We will get those made  
17 right away, Mr. Chairman.

18 THE CHAIRMAN: How soon do you expect to  
19 be getting into them?

20 MR. B. CAMPBELL: Immediately.

21 Maybe what we could do is do a small  
22 number of copies of about the first twenty pages and  
23 then pick up the rest later, save a little time, if  
24 that could be arranged.

25 ---Off the record discussion.

1 MR. B. CAMPBELL: We will take care of  
2 that and we should be back shortly on that.

3 Perhaps I could just finish introducing  
4 the panel. Take care of one or two other items.

5 Sitting next to Mr. Shalaby is Mr. Brian  
6 Dalziel. Now, Mr. Dalziel is a strategic planning  
7 officer, demand/supply strategy integration department,  
8 corporate programming division, environment and  
9 corporate planning branch.

10 I can advise the Board that I make a note  
11 as to how to pronounce this name; and having discussed  
12 it with Mr. Dalziel, the way I make my note is D-e-e --  
13 e-l, so it's Dee-el.

14 THE CHAIRMAN: How is it spelled?

15 MR. B. CAMPBELL: It is spelled  
16 D-a-l-z-i-e-l. It is pronounced Dee-el.

17 MS. PATTERSON: Couldn't it be R-i-e-l,  
18 like Riel? [Laughter].

19 MR. B. CAMPBELL: Next to Mr. Dalziel is  
20 Helen Howes, senior environment advisor, environment  
21 division; again that is part of the environment and  
22 corporate planning branch.

23 Next to Ms. Howes is Mr. Ken Snelson, who  
24 is manager, demand/supply strategy integration  
25 department; again, corporate programming division,

1 environment and corporate planning branch.

2 Also familiar to you is Dr. Jane Tennyson  
3 who is a community studies consultant, corporate  
4 relations, planning and research department and has  
5 appeared before you.

6 Now, I have reminded the witnesses who  
7 have appeared before you that they remain under oath in  
8 these proceedings, but we do need to have Mr. Dalziel,  
9 Ms. Howes and Dr. Long sworn in.

10 THE CHAIRMAN: Okay.

11 AMIR SHALABY,  
12 JOHN KENNETH SNELSON,  
13 JANE BERNICE TENNYSON; Recalled.  
14 FREDERICK GEORGE LONG,  
BRIAN PAUL WILLIAM DALZIEL,  
HELEN ANNE HOWES; Sworn.

15 MR. B. CAMPBELL: Mr. Chairman, I would  
16 like to outline briefly that the evidence of this panel  
17 is expected to go I think well into tomorrow and it has  
18 what I think are six sort of, broadly speaking, six  
19 segments.

20 There is a short introduction. There is  
21 a quick reminder of what the previous panels have  
22 covered with an emphasis on those matters that are  
23 particularly pertinent to planning and integration  
24 aspects. And that second section against that  
25 background leads to a comparison of options against the



1 criteria that were used in planning.

2 The third segment of evidence shifts from  
3 discussion of the options to a discussion of plans with  
4 the focus on the planning strategy and the planning  
5 process. The fourth segment deals with the formulation  
6 of plans leading up to the Update. The fifth segment  
7 will deal with the characteristics of the Update plans  
8 and comparisons. And the final section is really a  
9 summary that relates to the undertaking and the  
10 approvals requested.

11 There are many subdivisions within that  
12 of course, but I will try to keep you generally  
13 advised, for instance, at the end of today as to where  
14 we are in that broad scheme.

15 As I said, we have Exhibit 682, which is  
16 the overheads. And if I could, I would ask the Board  
17 to have that material in front of it as well as the  
18 Panel 10 witness statement, which is Exhibit 646. I  
19 believe in terms of actually asking you to turn to  
20 documents, if you have those two you will have most of  
21 the material that we will be directly asking you to  
22 look at.

23 And if I could, Mr. Chairman, perhaps it  
24 would be useful to reserve Exhibit No. 683 for  
25 interrogatory references.

1 THE CHAIRMAN: All right. 683 for  
2 interrogatory references. In case there are some  
3 undertakings we should make it now 684 for that.

4 MR. B. CAMPBELL: You always know, Mr.  
5 Chairman, how reluctant I am to contemplate the thought  
6 that there would be any undertakings, but I suppose  
7 wiser heads than mine should prevail with the reality  
8 that I expect there may be one or two before we are  
9 finished.

10 THE REGISTRAR: 684 for undertakings.

11 MR. B. CAMPBELL: Now, Mr. Chairman, if I  
12 could just take a moment I will check and see where we  
13 are on having the front end of the things copied.  
14 ---Off the record discussion.

15 MR. B. CAMPBELL: Mr. Chairman, I think  
16 we have distributed extra copies of at least the front  
17 portion of the package and later in the day we will  
18 provide the balance to those who do not have it with  
19 them.

20 [10:15 a.m.]

21 DIRECT EXAMINATION BY MR. B. CAMPBELL:

22 Q. Mr. Snelson, I think my first  
23 question on this panel is to you, and I would ask you  
24 to outline briefly, please, the main principles that  
25 Hydro has adopted to guide the integration of

1 demand/supply options in its planning.

2 MR. SNELSON: A. The demand/supply  
3 planning strategy was adopted in early 1989 and has  
4 guided all of our demand/supply planning since that  
5 time, and from that strategy, which is Exhibit 74,  
6 there are five priority strategic directions which are  
7 outlined on pages 6 and 7 of that exhibit and they have  
8 been reproduced as page 1 of our overhead package which  
9 is Exhibit 682.

10 And while since this strategy was  
11 developed there has been quite a lot in the way of  
12 changing information which is used in planning, and the  
13 plans themselves have also changed, for instance, the  
14 changes that have been documented in the Update Plan,  
15 1992 Update. During that time the priority strategic  
16 directions have not changed and they have guided our  
17 planning through that whole period.

18 If we just work our way through the  
19 priority strategic directions, you can see how they  
20 have guided the planning process.

21 The start of the planning process is of  
22 course the definition of the basic load forecast, and  
23 then once that is defined the strategy defines how we  
24 will attempt to meet the basic load forecast, and one  
25 of the first things we try to do is determine the

1 capability of the existing system and that relates to  
2 the first priority strategic direction of maintaining  
3 and improving the existing and committed system.

4 The next thing is the estimate of the  
5 maximum economic demand management options which of  
6 course relates to the second direction, and then we try  
7 and estimate the maximum economic non-utility  
8 generation particularly from renewable and cogeneration  
9 sources.

10 We also try to set an orderly program to  
11 develop the remaining hydroelectric potential in the  
12 province. And if these options are not sufficient,  
13 then we will have a requirement for major supply and  
14 the strategy is to keep open the options for major  
15 supply so that they are available if and when required,  
16 and that clearly is the last of these priority  
17 strategic directions.

18 Now, the structure of your initial  
19 submission, which was Exhibit 3, followed this general  
20 order and was based on these principles. The structure  
21 of our evidence panels has also been based on this  
22 order and these principles, and this panel will be  
23 pulling together, at the back end, the results of that  
24 process and builds and relies on the evidence of all  
25 the preceding panels to produce a comprehensive

1 Demand/Supply Plan based upon these principles.

2 Q. Now, Mr. Shalaby, I would like to  
3 turn to you.

4 I am going to, Mr. Chairman, be asking  
5 the witnesses to deal briefly with the evidence of the  
6 previous panels.

7 I want to start with Mr. Shalaby and ask  
8 you to identify where Panel 1 left off and the load  
9 forecast that was used for preparing the 1992  
10 Demand/Supply Plan Update which is filed as Exhibit  
11 452.

12 MR. SHALABY: A. Well, the basic load  
13 forecast that was used for the preparation of that  
14 Update is based on the evidence presented by Panel 1.

15 Since the presentation of the evidence of  
16 Panel 1, Mr. Burke and his staff updated their forecast  
17 and documented their Update in Exhibit 467. There is a  
18 complete discussion in that exhibit of the different  
19 things that have changed and how they affected the  
20 basic load forecast and perhaps I will draw and your  
21 attention to the major findings in that Update.

22 There were two key assumptions that  
23 reduced the forecasts that Mr. Burke presented here in  
24 Panel 1.

25 Q. When he presented that, that was the



1 1990 basic forecast?

2 A. He presented the 1990 load forecast  
3 and in his Update two assumptions resulted in a  
4 reduction from the level that was presented as the 1990  
5 forecast. And the two assumptions are, that it is now  
6 considered a higher projection for electricity prices.  
7 They now assume that electricity is going to be higher  
8 in price by something like 13 per cent by the year  
9 2000, and 9 per cent by the year 2015. Of course, the  
10 impact of a higher price was discussed by Mr. Burke  
11 under the topic of price elasticity and higher price  
12 leads to a reduction in demand, and that's exactly what  
13 the Update shows.

14 The second factor that led to a reduction  
15 in demand is a lower projection of economic activity in  
16 Ontario. The economic activity measured by the GDP, or  
17 gross domestic product, for Ontario is projected for .7  
18 per cent lower by the year 2000, and about 2.6 per cent  
19 lower by the year 2015.

20 So these two factors resulted in a lower  
21 basic forecast in the Update, and the reduction by the  
22 year 2000 is about 5 per cent, which is about 1.5  
23 gigawatts in the peak, and by the year 2000 it's about  
24 6 or 7 per cent which is 2.7 gigawatts in the peak  
25 demand.

1                   The majority of that reduction is  
2 explained as due to the higher price for electricity.

3                   Q. All right. Now, I understand that  
4 the next overhead shows the Update forecast; is that  
5 correct?

6                   A. That is correct.

7                   Q. That's page 2 of Exhibit 682?

8                   A. It is. And the data on that graph  
9 are extracted from Exhibit 452 and Exhibit 467, that I  
10 just referred to as documenting the details of the  
11 Update to the load forecast.

12                   The graph in front of us shows three  
13 lines and really they are quite similar, all three of  
14 them, but two are more similar than others.

15                   The Update is the lower line with the  
16 plus signs. The legend, I think the bottom two symbols  
17 on the legend should be reversed. So the plus signs  
18 refer to the Update, the dark square would refer to the  
19 DSP, and the straight line would refer to the 1990  
20 forecast.

21                   The top line is the 1990 forecast, it's  
22 the highest of all of these three basic median  
23 forecast. I would remind you again that what we are  
24 looking at here is a median forecast.

25                   The lowest line is the Update, and the



1 one in the middle is the DSP 1989 vintage basic load  
2 forecast.

3 The conclusion I draw from looking at  
4 that picture is that the Update is much closer to where  
5 we started off in 1989 and slightly lower than the 1990  
6 forecast that Mr. Burke presented here.

7 Q. Now, that deals with the median  
8 projection. Can you address, please, the evolution of  
9 the bandwidth around the median forecast?

10 A. Mr. Burke explained in detail the  
11 evolution of the load forecast bandwidth. He had a  
12 chart in Exhibit 100 that he used as overheads for  
13 Panel 1 that showed how the bandwidth evolved since  
14 1989, and he introduced further modifications on the  
15 stand here during cross-examination particularly to the  
16 tail end of the bandwidth.

17 If I may refer to figure 3 of Exhibit  
18 682, it shows how the bandwidth was left at the end of  
19 Panel 1 testimony, that's the solid lines, and how the  
20 bandwidth has shifted down a bit as result of the  
21 Update.

22 So we see essentially a bandwidth similar  
23 in shape, it has just shifted down because of the two  
24 factors I mentioned, the higher electricity prices and  
25 the lower economic activity projected for Ontario.

1                   Like the comparison we made to the  
2 median, maybe I want to show you the Update compares to  
3 where we started off in 1989, and that's on figure 4,  
4 the update is the dotted line and the 1989 bandwidth is  
5 in solid lines. What that graph shows is that the  
6 bandwidth is wider towards the end of the planning  
7 heard period in the Update.

8                   Q. Now, where has that taken you in  
9 carrying that information forward into planning  
10 decisions?

11                  A. Well, there are really two thoughts  
12 that I think dominate all of the observations of the  
13 load forecasts, the basic load forecasts, one is that  
14 the median basic is very much similar to where we  
15 started off in 1989, slightly lower than 1990. So not  
16 much change since the 1989 forecast in the median.

17                  When we moved to the bandwidth we have a  
18 slightly wider bandwidth towards the end of the  
19 planning horizon.

20       [10:25 a.m.]

21                  Q. Now, I would like to then come back  
22 to you, Mr. Snelson, and deal with Panel 2. Would you  
23 please, just briefly, review the Panel 2 matters that  
24 are relevant to this panel and indicate any areas where  
25 there have been development since that panel gave its

1 evidence.

2 MR. SNELSON: A. The principles  
3 discussed by Panel 2 still apply. They talked about  
4 the characteristics of the existing system, which are  
5 largely also the characteristics of the future system,  
6 and the existing system makes up a large part of what  
7 will be the future system. They also discussed the way  
8 in which we manage environmental performance and  
9 considerations used in setting the reliability reserve  
10 margin.

11 There have been some changes in data  
12 assumptions, and some of these have already been  
13 addressed in Panels 3 through 9. In particular, the  
14 question of life extension was discussed further by  
15 Panel 8 with respect to fossil plant, and there have  
16 been some revised in-service dates for Darlington which  
17 I believe were discussed by Panel 9.

18 With respect to the reliability reserve  
19 margin, Panel 2 indicated that a reserve margin of 24  
20 per cent was used to preparing the 1989 Demand/Supply  
21 Plan and that reserve margin has been carried forward  
22 into the preparation of the Update Plan. We will have  
23 some further discussion of whether that is appropriate  
24 for the Update Plan when we talk about the  
25 characteristics of that plan.

1                   One of the other key results of Panel 2  
2           was the capability of the existing system. And the  
3           next figure, which is Figure 5, page 5 of Exhibit 682,  
4           shows the generating capacity of the existing system as  
5           it was in 1989 during the preparation of the  
6           Demand/Supply Plan, Exhibit 3, and how we see it today.  
7           And apart from the changes with respect to life  
8           extension of some fossil plant, there is no substantial  
9           difference between these two lines.

10                   I would remind you that in our definition  
11           of the existing system for planning purposes, we have  
12           said that that includes the existing system up to and  
13           including Darlington. It does not include the Manitoba  
14           Purchase or any of the new hydraulic which we are  
15           seeking approval, nor does it include any new  
16           non-utility generation.

17                   In this particular figure we have shown  
18           the effects of the existing system with and without  
19           life extension. As we go through these figures on this  
20           panel in some cases it will be too complicated to show  
21           both figures; and if we don't note it otherwise, then  
22           the line will be with a life extension.

23                   The next figure, which is page 6 of  
24           Exhibit 682, shows the load meeting capability of that  
25           generating capacity and that has been reduced by the 24

1 per cent reserve margin.

2 Q. How does the load meeting capability  
3 compare to the latest basic load forecast.

4 A. That is shown on the next figure  
5 which is page 7 of Exhibit 682. This shows the  
6 difference between the basic load and the load meeting  
7 capability of the existing system; and the difference  
8 between these two lines defines the required amount of  
9 demand or supply options that are required.

10 Q. And that's for the median load  
11 growth, as I understand?

12 A. That's for the median load growth.  
13 And you can see that the effect of life extensions is  
14 relatively small and generally post-2008.

15 The next figure, page 8, of Exhibit 682,  
16 shows the same picture for upper load growth and  
17 obviously the requirements are quite a lot larger. I  
18 would caution you a little bit in interpretation of the  
19 first few years of the basic load line in this set of  
20 figures because the upper load forecast has not been  
21 adjusted to account for either the actual load  
22 experience in the last year or so, and therefore does  
23 not capture the effects of the current recession, so  
24 the upper load forecast probably understates -- sorry,  
25 overstates the amount of load that might be there for



1 the first three or four years.

2 The next figure which is Exhibit 682,  
3 page 9, shows the same picture for lower load growth  
4 and you can see that there are still requirements  
5 starting soon after the turn of the century.

6 THE CHAIRMAN: Why doesn't the upper load  
7 growth take into account the current recession?

8 MR. SNELSON: A new estimation of the  
9 bandwidth was not done. In the update to the load  
10 forecast that Mr. Shalaby described, the median load  
11 was re-estimated and the bandwidth was applied about  
12 that median load forecast.

13 So we believe that is satisfactory for  
14 the longer term but it tends not to fully incorporate  
15 the latest intelligence about what is happening over  
16 the short term.

17 MR. B. CAMPBELL: Q. For instance, Mr.  
18 Snelson, would it be fair to say that to the extent  
19 that it shows a difference between median and upper at  
20 1991 and partway into '92, you know what the actual  
21 load is, so to talk about a range at that point is  
22 consistent with the point you are trying to make.

23 MR. SNELSON: A. Precisely.

24 Q. Now, Mr. Snelson, looking at these  
25 different charts, does that information provide a basis



1 to describe the consequences of not planning for any  
2 demand or supply options?

3 A. In very general terms it does. If we  
4 go back to page 7 of Exhibit 682, which is for median  
5 load growth, then you can see that the load meeting  
6 capability of the existing system is less than the  
7 basic load forecast from about 1995 on. And that's an  
8 indication that from that time period on, if we had no  
9 new demand or supply options, all we did was to  
10 maintain the existing system, then we would start to  
11 have inadequate reserve margins at that point in time  
12 and the situation would get progressively worse.

13 By about 1998, the reserve margin will  
14 have dropped to about 10 per cent and since the average  
15 forced outage rate of generating plant is about 10 per  
16 cent, then at that point in time we would have about a  
17 50 per cent chance of being able to meet our peak load  
18 and so reliability has become quite serious at that  
19 point.

20 Along with this there would also be a  
21 deterioration in the energy picture. One would  
22 experience rising coal and oil use, increasing  
23 emissions which could be partially offset by increased  
24 additional environmental controls.

25 Under upper load growth, the reserve

1 would be indicated by the figure to be below 24 per  
2 cent almost immediately, recognizing the overstatement  
3 of the upper bandwidth in the short term. I think the  
4 proper interpretation would be that we would cease to  
5 have adequate reserves as soon as this current  
6 recession is over and the load starts to pick up.

7 In this case, it shows reserves dropping  
8 below 10 per cent by about 1995 and the consequences  
9 are similar to those under median load growth but much  
10 sooner.

11 THE CHAIRMAN: Not quite so fast. Mr.  
12 Snelson. Not quite so fast. Don't read your script  
13 quite so fast.

14 MR. SNELSON: Actually I'm not reading my  
15 script, sir.

16 THE CHAIRMAN: Well then you are very  
17 articulate, but anyway not quite so fast.

18 MR. SNELSON: Sure.

19 And under low load growth - I wasn't  
20 intending that you would look at these figures again -  
21 recognizing that there is a need beyond the year 2000,  
22 then there would also be deterioration but at a much  
23 slower rate. So, if we were to look at the situation  
24 under median, higher and lower load growth, then there  
25 is a need for additional demand or supply options in

1 addition to the capability of the existing system in  
2 all load growth cases.

3 MR. B. CAMPBELL: Q. Now, Mr. Shalaby, I  
4 would like to come back to you then and again turning  
5 to the evidence this time given by Panel 3, can you  
6 advise whether the concepts introduced in that panel  
7 are still relevant and being applied in the  
8 Demand/Supply Plan.

9 MR. SHALABY: A. Panel 3, which seems  
10 like ages ago now, addressed the costing concepts and  
11 avoided cost methodologies. And those concepts were  
12 relied on in evaluating and formulating the integrated  
13 demand/supply plans in 1989, and we relied on them  
14 again in evaluating and formulating the plans in 1992.

15 So those concepts are still valid, Mr.  
16 Campbell.

17 Q. Now, you spent a lot of time  
18 describing detailed methodologies for calculating  
19 system incremental costs, and I would ask you directly  
20 if there are any material changes in those methods?

21 A. No, there are not. And the most  
22 recent set of system incremental costs has been filed  
23 as Exhibit 592. It's the set that is dated March 1992  
24 and I will be presenting further information related to  
25 that exhibit, to the system incremental costs, later on

1 in the evidence.

2 Q. Are there changes to the way you  
3 apply those system incremental costs to calculate  
4 avoided costs?

5 A. No, there haven't been changes in  
6 that regard either. And in a similar way, I would be  
7 presenting the avoided costs for some representative  
8 options that we presented in Panel 3 to show the  
9 progression of how avoided costs have changed with the  
10 new system incremental values. That comes again later  
11 in the evidence.

12 Q. I take it you will also be closing  
13 the loop with respect to looking at the newer avoided  
14 costs and the options to which they are particularly  
15 relevant.

16 A. Yes, we promise to at this stage show  
17 how the demand management plan, the non-utility  
18 generation plan, the hydraulic plan, and the Manitoba  
19 Purchase, how these become consistent with the major  
20 supply plans, how the loop is closed once a formulated  
21 integrated plan is presented, and we will do that later  
22 on in the evidence as well.

23 Q. If I can move you then to Panel 4,  
24 Mr. Shalaby, can you advise whether the evidence given  
25 with respect to demand management was utilized in

1 preparing the 1992 Update.

2 A. Yes. For the most part, the evidence  
3 presented in Panel 4 is what was used for the  
4 preparation in the Update. Figure 10 of Exhibit 682  
5 shows the total demand management that Panel 4  
6 presented, which is the top line in that graph. And  
7 compared to what we used in the 1992 Update, which is a  
8 line that is slightly below it. Also shown on the same  
9 diagram what was used in the 1989 Demand/Supply Plan,  
10 which is a much lower line on that page.

11 The concepts and main ideas that we  
12 introduced in Panel 4 are valid. The minor changes are  
13 related to a lower estimate of two components in demand  
14 management and they are load shifting and discount  
15 demand service. Discount demand service is what we  
16 refer to as interruptible load, customers that accept  
17 interruptions in their load in return for a lower price  
18 year round. So those two components had had reductions  
19 since Panel 4 presented its evidence.

20 Q. Now, can I take it with respect to  
21 the change between the Update and Panel 4 lines in that  
22 chart, that there is no change with respect to the  
23 amount of energy efficiency improvements that are  
24 included in those figures.

25 A. No, the changes, as I said, are



1 related only to load shifting and discount demand  
2 service. The bulk of demand management, as you recall,  
3 is in the efficiency improvement measures and those  
4 remain intact similar to what Panel 4 has presented.

5 THE CHAIRMAN: You are talking about the  
6 Update, just to be clear you are talking about as of  
7 Exhibit 452. That's January 15th or thereabouts of  
8 1992.

9 MR. SHALABY: The Update is 452, that is  
10 correct.

11 THE CHAIRMAN: So when you are speaking  
12 about what has changed or what hasn't changed, you are  
13 talking in terms of January 1992?

14 MR. SHALABY: That is correct.  
15 [10:40 a.m.]

16 The efficiency improvement is the  
17 component in demand management that involves the  
18 reduction in energy consumption. So it is by far the  
19 most significant component in demand management and  
20 that remains similar to what Panel 4 presented.

21 The lower demand discount service and  
22 load shifting come because of recent experience in  
23 these two areas. The load shifting has been reduced by  
24 250 megawatts in the year 2000, the amount at that time  
25 was 1,000 megawatts, it is reduced by 250 to 750



1 megawatts, and it is because of less than expected  
2 response from customers to the time-of-use rates that  
3 we introduced to entice load shifting.

4 The reason for lower demand discount  
5 service, the reason for lowering it, the expectation is  
6 that we experienced a large number of cancellations  
7 last year. A lot of customers notified Hydro that they  
8 wished to shift to firm service and away from the  
9 discount service. We felt that a reduction of 130  
10 megawatts down from the 700 megawatt level that we  
11 expected by 130 would be appropriate at this time to  
12 reflect that recent experience.

13 We are still working on the interactions  
14 between the demand discount service, the load shifting  
15 and the new component in demand management which is  
16 fuel switching. Those three programs in the demand  
17 management, or the three areas in demand management,  
18 have links and they interact with each other and there  
19 are impacts resulting from the introduction of fuel  
20 switching on demand discount service and load shifting,  
21 so that area is being worked out at this time as well.

22 MR. B. CAMPBELL: Q. In saying all that,  
23 however, has Hydro resiled in any way from the target  
24 of achieving 5,200 megawatts of demand reductions by  
25 the year 2000?

1                   MR. SHALABY: A. No. Hydro continues to  
2 hold the target of 5,200 megawatts by December 2000,  
3 and despite the reductions in some portions of the  
4 demand management programs, there will be efforts to  
5 recover that in other areas or further into time. So  
6 the 5,200 megawatt target remains.

7                   Q. If we can focus particularly on the  
8 EEI portion of that target which as you pointed out is  
9 by far the largest portion, what is your understanding  
10 of Hydro is doing on those programs?

11                  A. My understanding is that the  
12 efficiency programs are achieving their objectives in  
13 1992 -- in 1991, I'm sorry, and there are data  
14 presented to the Ontario Energy Board this year that  
15 shows how the planned and actual programs in 1991 have  
16 performed.

17                  So, in general, my understanding is that  
18 the efficiency programs are on target but the load  
19 shifting programs are falling short. They are  
20 achieving roughly half their planned objectives for  
21 1992.

22                  Q. Now, Mr. Snelson, I would like to  
23 come back to you then with respect to Panel 5 relating  
24 non-utility generation. Perhaps you could go through  
25 the same kind of discussion with respect to the matters

1 raised on Panel 5 and in particular highlight those  
2 aspects that this panel is intending to rely on in  
3 dealing with the updated Plan.

4 MR. SNELSON: A. As you will recall,  
5 Panel 5 discussed Ontario Hydro's non-utility  
6 generation program and our experiences in that regard,  
7 and they established that the non-utility generation  
8 can provide significant capacity to the system and that  
9 the industry is becoming more mature and that these  
10 options tend to have more flexibility than Ontario  
11 Hydro's own generation, in particular, having shorter  
12 lead times.

13 They discuss the total potential for  
14 non-utility generation, establishing that by the year  
15 2000 there is a target of 3,100 megawatts, and that by  
16 the year 2014 non-utility generation could provide  
17 4,200 megawatts. This estimate is from existing NUGs,  
18 committed NUGs, and certain preferred non-utility  
19 generation technologies.

20 I will remind you that the preferred  
21 technologies are hydroelectric, other renewables, waste  
22 fuels, and high-efficiency cogeneration that meets a  
23 target for less than a specified heat rate.

24 In addition, major supply non-utility  
25 generation could provide additional capacity from

1 technologies which are substantially similar to  
2 technologies that Ontario Hydro could employ, and those  
3 would be part of Ontario Hydro's major supply options.

4 None of these matters has changed since  
5 the appearance of Panel 5.

6 The latest information in terms of  
7 detailed numerical information is included in a  
8 transcript undertaking which is Exhibit 322.21, which  
9 is called the Non-Utility Generation Update.

10 The quantities of non-utility generation  
11 and the estimates of what can be achieved we believe  
12 are consistent with avoided costs based on the Update  
13 Plan and the specifics of that will be discussion when  
14 we talk about the Update Plan.

15 There have been some developments in the  
16 way in which the non-utility generation program is  
17 being managed since Panel 5. Because we now see the  
18 possibility of having surplus capacity in the mid to  
19 late 1990s and perhaps beyond, then we have had to take  
20 some actions to manage the non-utility generation  
21 program. We are proceeding with all contracted  
22 non-utility generation whether or not we are in a  
23 period of surplus, the same as we are proceeding with  
24 the contracted Manitoba Purchase.

25 There are, however, projects which have

1 status to negotiate but no contract, and these  
2 represent about 13 projects of about 1,600 megawatts of  
3 capacity and these projects are being renegotiated.

4 THE CHAIRMAN: I'm sorry, could you give  
5 those figures again?

6 MR. SNELSON: Yes, 13 projects,  
7 representing 1,600 megawatts of capacity.

8 THE CHAIRMAN: Thank you.

9 MR. SNELSON: These contracts or these  
10 proposed contracts are being renegotiated with the aim  
11 of reducing upward pressure on rates in 1990s that  
12 would result from buying additional non-utility  
13 generation capacity that's not needed, that would just  
14 result in less use of the existing system.

15 We also aim to modify the projects to  
16 meet the guidelines for high efficiency and renewable  
17 cogeneration ration, high efficiency and renewable  
18 non-utility generation which were announced in October  
19 while the panel was on the witness stand and were given  
20 the Exhibit No. 346.

21 The overall aim is to delay the projects  
22 to better match need and meeting the guidelines may  
23 result in projects that are more efficient, better  
24 matched to their heat demand but would actually also be  
25 smaller in electricity demand and better matched to the



1 needs of the electricity system in the 1990s.

2 Projects which are less than 5 megawatts  
3 and hydroelectric and other renewable projects are  
4 still being accepted.

5 We believe these developments are  
6 consistent with the thrust of Panel 5's evidence, and  
7 that the Update is based on being able to achieve the  
8 3,100 megawatts that were discussed in Panel 5, if  
9 needed by the year 2000. We will be discussing in our  
10 discussion of illustrative surplus management how the  
11 NUG program may be cut back or delayed to reduce that  
12 surplus, and such cutbacks would be focussed on the  
13 major supply NUG part of the program in the main.

14 The Update does place greater emphasis on  
15 the flexibility of non-utility generation. It aims to  
16 take advantage of the shorter lead times of non-utility  
17 generation, while making full use of non-utility  
18 generation to delay the needs for major new supply and  
19 to maintain our preferences.

20 MR. B. CAMPBELL: Q. All right. Now,  
21 what I would like you to do at this point is take us, I  
22 guess, through the next step of the process of  
23 assessing the needs and requirements by including or  
24 commenting on the effects of all of the load reducing  
25 options taken together on the need for supply, and I



1 would ask you to reflect in that that portion of the  
2 NUGs which is load displacement NUGs.

3 MR. SNELSON: A. Yes. The reductions  
4 from basic load forecast are shown on the next figure  
5 which is page 11 of Exhibit 682. This figure shows all  
6 the components of the load reducing options that  
7 contribute to reducing the basic load forecast to the  
8 firm load. These include demand management options  
9 such as electricity efficiency improvements, fuel  
10 switching, load shifting, and discount demand service.

11 There is also a small segment there for  
12 load displacement non-utility generation which is  
13 treated as a reduction from load.

14 The result of this series of reductions  
15 is the firm load, which is the load that we have to  
16 plan to reliably meet with supply.

17 You might note that this figure has a  
18 suppressed zero which tends to --

19 Q. Suppressed zero means that the  
20 left-hand side doesn't go down to zero; is that right?

21 A. That's correct. Which tends to  
22 exaggerate the proportions a little bit but enables you  
23 to see the components more clearly.

24 However, the total reduction in load is  
25 quite significant. By the year 2017 or so, the total

1 reduction is about half today's load, and it is about a  
2 quarter of the predicted 2017 basic load. So this is a  
3 substantial reduction.

4 The next figure, which is page 12 of  
5 Exhibit 682, shows the firm load compared to the load  
6 meeting capability of the existing system for median  
7 load growth.

8 On this basis, the need date for new  
9 supply is about the year 2003.

10 Q. Looking at the chart it grows  
11 relatively slowly I take it beyond that point and  
12 starts to broaden out at about 2008 and 2009; is that  
13 correct?

14 A. That is correct, and the degree of  
15 broadening is affected by whether or not life  
16 extensions are assumed.

17 Q. Staying then with you, Mr. Snelson,  
18 but advancing to Panel 6, again could you deal with the  
19 particular points from that panel that are material to  
20 the Update and describe whether there are any  
21 significant changes since the giving of that evidence?

22 A. Panel 6 discussed the hydroelectric  
23 potential in the Province of Ontario and established  
24 that there is an attainable potential for new  
25 hydroelectric capacity of 1,400 to 1,800 megawatts in

1 capacity, with a corresponding energy of about 3,500  
2 gigawatthours.

3 This was based on the screening of the  
4 full technical potential for hydroelectric development  
5 in the province.

6 They showed that there is sufficient  
7 capacity with cost benefits, cost/benefit ratios in the  
8 order of about 1 or less that could make up that  
9 attainable potential, and we will show you later in our  
10 evidence how the cost/benefit ratios change with the  
11 Update Plan and that they are still consistent with  
12 that attainable potential.

13 [10:55 a.m.]

14 All of this attainable potential could be  
15 obtained from developments that are either  
16 redevelopments of existing generating plants or  
17 developments on rivers that are already controlled for  
18 hydroelectric purposes.

19 As you will recall the hydroelectric  
20 option is consistent with the preference in the  
21 strategy and the panel felt that, Panel 5, felt that  
22 there was sufficient attainable potential that we  
23 should rely on 1,800 megawatts for planning purposes.  
24 There was a sufficient degree of confidence that we  
25 could get it and that that potential was attainable in

1 the 25-year period.

2 Q. And that was Panel 6. I think you  
3 misspoke yourself and said 5.

4 A. I am getting my panels confused. It  
5 was Panel 6.

6 Q. I am going to hopefully not continue  
7 the confusion but continue with you and ask you to  
8 again go through briefly the same exercise with Panel  
9 7.

10 A. Yes, Panel 7 dealt with the purchase  
11 options and with transmission. They discussed the  
12 characteristics of the Manitoba Purchase, how that  
13 affects the need for transmission and in particular  
14 that there needs to be transmission between the  
15 Manitoba border and some suitable point in Northeastern  
16 Ontario. They also discussed the other benefits of  
17 that transmission which includes a major improvement in  
18 the integration of the Ontario system within Ontario,  
19 which is particularly important to Northwestern Ontario  
20 which at present is somewhat isolated. The panel also  
21 discussed the opportunities for better integration with  
22 other systems to the west of Ontario. On a more  
23 general level, the panel discussed how transmission in  
24 general fits into the integrated planning process.

25 Now, we have submitted a transcript

1       undertaking which is No. 442.7, which updates the  
2       evaluation of the Manitoba Purchase based on the Update  
3       Plan and that will be discussed later in our evidence  
4       after we have discussed the development of the Update  
5       Plan itself.

6               Q.   Now, at this point could you indicate  
7       how the load and capacity balance looks with the  
8       preferred and contracted options taken into account?

9               A.   Yes.   And the first figure which is  
10      page 13 of Exhibit 682 shows the additions to the  
11      capacity of the existing system through a number of  
12      supply options; in particular, the purchase non-utility  
13      generation, the hydroelectric, and the Manitoba  
14      Purchase.   And that adds to the capacity of the  
15      existing system to create the line that is labelled  
16      "projected generation".   That is in capacity terms  
17      before adjustments for reserve.

18              If we go to the next figure, which is  
19      page 14 of Exhibit 682, then that projected generation  
20      line has been reduced by 24 per cent to account for the  
21      reserve requirement to produce a line that is labelled  
22      projected load meeting capability and that is compared  
23      to the firm load that was discussed in one of the  
24      previous figures.

25              You can see that the need date for major



1 supply is delayed until about 2009 and that the  
2 projected generation line exceeds the firm load line  
3 for some considerable period of time but particularly  
4 shortly before and for a few years after the year 2000,  
5 and these two factors, a greatly delayed need for major  
6 supply and the possibility of surplus capacity from  
7 preferred options, have been major drivers in the  
8 preparation of the Plan Update.

9 Now, you can see this in perspective if  
10 we go to the next figure, which is page 15 of Exhibit  
11 682, which has the same information as the previous  
12 figure, but on this figure we have also included the  
13 basic load and the load meeting capability of the  
14 existing system which if you like are the two starting  
15 points of the planning process. And you can see from  
16 this figure that the preferred options have the  
17 capability we believe of meeting most of our  
18 requirements under median load growth.

19 Q. Now, I want to turn back to you then,  
20 Mr. Shalaby, and ask you to deal briefly in the same  
21 manner with the Panel 8 matters.

22 MR. SHALABY: A. The points we left at  
23 the end of Panel 8 that we relied on for integrated  
24 planning, for formulating an integrated plan, is that  
25 the life management and life extension of some of



1 Hydro's fossil stations is a feasible option and is now  
2 an option that is part of the 1992 Update.

3 We saw on Panel 8 a number of new fossil  
4 options that generated electricity using various types  
5 of fuels like coal, oil, and natural gas, and we  
6 described the environmental impacts and the levelized  
7 unit energy costs associated with those options. And  
8 those estimates are the estimates we relied on in  
9 formulating the Update.

10 Of particular significance to the Update  
11 is the availability of natural gas-fired options,  
12 whether they be combustion turbine units or  
13 combined-cycle units or major supply NUGs. The  
14 economics of those options are favourable particularly  
15 when natural gas prices do not rise or stay where they  
16 are today. So that factor, the availability of natural  
17 gas-fired options that are short in lead time and  
18 favourable in economics is a major influence in the  
19 Update.

20 Finally, we introduce a number of  
21 alternative energy technologies. You will recall fuel  
22 cells, biomass, municipal waste, solar and wind. And  
23 we showed that they have potential to provide  
24 electricity in Ontario, but at the moment they are  
25 limited by high costs and limited to niche applications

1 in the marketplace.

2 The exact potential of those technologies  
3 we indicated will depend on identifying acceptable ways  
4 of harnessing the potential and on technology  
5 development that would reduce costs.

6 The Update relies in some of the cases  
7 that are formulated on fuel cells and biomass. So, of  
8 particular significance then to the Update from the  
9 family of options that we described as alternative  
10 technologies is the fuel cell option and the biomass  
11 option. Those we will rely on in some of the cases.

12 That's in brief the items for Panel 8  
13 that found their way into the integrated plant.

14 Q. Mr. Chairman, having just completed  
15 Panel 9 last Wednesday, we decided to dispense with any  
16 review of the information presented by that panel. Of  
17 course the costs and other characteristics of the  
18 options were well examined, I submit, on that panel and  
19 that information was also part of what was used in the  
20 Update, but we thought it would not be a good use of  
21 your time to run through that.

22 Now, Mr. Snelson, I want to come back to  
23 you then and turn the discussion towards the evaluation  
24 criteria which were used by Hydro to evaluate options  
25 and plans and I am going to ask you to address that

1 matter first in a general way, please.

2 MR. SNELSON: A. Yes, the planning  
3 criteria are outlined in the demand/supply planning  
4 strategy which is Exhibit 74 on page 29. You don't  
5 need to turn those up because they have been reproduced  
6 as page 16 of Exhibit 682, which is now shown on the  
7 overhead.

8 The criteria can be used in at least two  
9 ways and we have certainly used them in two ways. We  
10 have used them both to compare options and there is a  
11 discussion in Exhibit 3 on page 14-5 with respect to  
12 the application of these criteria to the selection of  
13 major supply options. And also in Exhibit 3 on page  
14 15-2, there is a discussion of the application of  
15 criteria, these criteria, to the evaluation of plans.

16 We will be discussing the demand/supply  
17 planning strategy later in our evidence. However, we  
18 brought forward the discussion of planning criteria so  
19 that they could be used as the basis for the option  
20 comparison that will follow.

21 These criteria are elements 1.7 and 1.8  
22 of the strategy. And the rationale for them is  
23 discussed either with that statement of what the  
24 criteria are or throughout the document with the more  
25 specific strategies that are relevant to the

1 application of these criteria.

2 For instance, one of our criteria is low  
3 costs of electricity service and that is also a  
4 strategy element in its own right and the justification  
5 for that appears in the strategy document with that  
6 specific strategy.

7 We are not providing a comprehensive  
8 discussion of these criteria at this point in time on  
9 their meaning and use. That will become more apparent  
10 as we show how we use them and in the discussion of the  
11 comparison of options and the evaluation of plans.

12 Throughout our evidence, we will be  
13 discussing most of these criteria explicitly, either  
14 through the option comparison or through the plan  
15 comparison. Or in some cases in both.

16 However, one of the first criteria and  
17 it's given considerable prominence in the strategy is  
18 customer satisfaction. And you will find very little  
19 direct discussion of customer satisfaction in our  
20 evidence.

21 Now this is because to achieve customer  
22 satisfaction we believe we have to achieve a  
23 satisfactory or better than satisfactory performance on  
24 almost all of the other criteria. For instance, if we  
25 had a plan that was not reliable, then that wouldn't be

1 consistent with customer satisfaction. If we had a  
2 plan that failed to gain social acceptance, then that  
3 wouldn't be satisfactory with respect to customer  
4 satisfaction. And you could go through most of the  
5 criteria in that regard.

6 Q. Now you make a distinction here  
7 between primary and secondary criteria. Could you  
8 outline the rationale behind that, please.

9 A. The concept that is given between  
10 primary and secondary criteria is quite clear, but the  
11 practice is less so. The primary criteria in concept  
12 are things that we must meet. They are requirements.  
13 They must be met.

14 The secondary criteria are things which  
15 would be taken into consideration and may very well  
16 influence plans but they have a lesser degree of  
17 compulsion associated with them than the primary  
18 requirements.

19 When we come to actually applying them,  
20 then it is not easy to maintain this distinction. For  
21 example, environmental requirements that are set by  
22 law, are clearly primary criteria. They must be met.  
23 Other environmental characteristics which we would  
24 choose to try to be able to meet in most circumstances  
25 may very well be considered to be secondary criteria.



1                   However, Ontario Hydro does at times  
2     adopt for itself internal standards that it aims to  
3     achieve. In those cases they become primary criteria  
4     and that was enunciated on page 30 of Exhibit 74. And  
5     you could also consider a forecast that the laws were  
6     going to become more strict, that there would be more  
7     requirements in the future to also be a primary  
8     requirement. So the distinction gets quite  
9     considerably blurred in the actual application.

10                  So, we don't generally try to maintain a  
11     clear distinction through the rest of our evidence as  
12     to what is primary and what is secondary.

13                  Q. And obviously when you have got  
14     different criteria, you have got to make trade-offs  
15     between them given the wide areas that they cover. Do  
16     you have any sort of fixed mathematical scheme for  
17     doing this?

18                  A. No. That was discussed in Exhibit 74  
19     and Exhibit 3 and the conclusion was that it wasn't  
20     practical to establish a definitive ranking or a fixed  
21     numerical weighting scheme to be able to trade off  
22     between these criteria that affect such widely  
23     different areas of performance.

24                  The reasons for not being able to do so  
25     are quite similar to the reasons for not being able to



1 monetize external effects that were discussed at length  
2 in Panel 3's evidence. They relate to such factors as  
3 some of them only being quantifiable in physical terms  
4 but not in monetary terms. Some of them only being  
5 able to be quantified to a very limited degree and  
6 relying upon judgment in some respects. The customer  
7 priorities and values that may be different from one  
8 time to another. The way in which, with evolving  
9 circumstances, then different criteria may seem to take  
10 on and may quite rightly take on different weights at  
11 different times depending on the current issues that  
12 have to be addressed. And the ranking that you may  
13 give to a criterion may very well depend on how severe  
14 the impact is of any particular circumstance.

15 What it really boils down to is that even  
16 if you were to try to establish a numerical weighting  
17 scheme, in establishing that scheme you would have to  
18 apply all the same judgments that you end up making  
19 with respect to the final decision in the judgmental  
20 method of consideration that we were describing.

21 The evaluation of options and plans is a  
22 process of bringing together all that information, both  
23 the quantifiable and the qualitative information, and  
24 to assess the best choices in current circumstances.

25 Q. I understand your next slide

1 illustrates schematically how you try to do that.

2 A. The next slide illustrates in  
3 particular -- and that's at page 17 of Exhibit 682.  
4 This slide illustrates the correspondence between the  
5 option comparison tables which are attachment B to  
6 Exhibit 646, which was our witness statement for this  
7 panel, and this slide indicates the correlation between  
8 those option comparison tables and the particular  
9 criteria that I have listed.

10 There are some criteria which are not  
11 included in option comparison tables primarily because  
12 they apply more to plans than to options. For  
13 instance, it's hard to talk about the diversity of one  
14 option but you can talk about the diversity of a plan.  
15 And some of the criteria requires several pages of  
16 option comparison tables to describe them because they  
17 have many elements within them and, for instance, the  
18 environmental characteristics are described on several  
19 pages of those options comparison tables.

20 Q. Generally speaking, I take it then  
21 that the ones that are indicated with an X under the  
22 heading "Option Comparison Table" are those which tend  
23 to have a heavier influence at the plan comparison  
24 stage than the option comparison stage. Would that be  
25 fair?

1 A. That is fair.

2 The actual tables and I suggest that you  
3 find them now are attachment B to Exhibit 646 and we  
4 will be going through and referring to them in the next  
5 few segments of evidence.

6 [11:15 a.m.]

7 The information on these tables is  
8 obtained from an extension of figure 14-18 of Exhibit  
9 3, which compared the major supply options, and that's  
10 been extended to cover a wider range of options.  
11 Information from the environmental and social  
12 information has been included from Exhibit 4, and there  
13 is updated information based on the evidence of all the  
14 preceding panels.

15 Q. Now, Mr. Chairman, if the Board has  
16 that material in front of it, Appendix B to Exhibit  
17 646, I think I would like first, we are going to  
18 discuss a variety of these bases for comparison, and  
19 first I would like to turn to you, Mr. Dalziel, and ask  
20 you to address the safety criterion and how safety  
21 considerations affect your work.

22 MR. DALZIEL: A. As a planner our  
23 primary concern is to know that the option can be  
24 implemented safely for both the worker and the public.

25 Hydro aims to make each activity safe for

1 its worker. For example, it doesn't matter whether we  
2 are moving hundreds of pounds of office furniture  
3 within a head office building or whether we are moving  
4 hundreds of tonnes of coal at a generating station  
5 site, activity-by-activity we want to make sure that it  
6 can be carried out safely.

7 With respect to the public, Hydro aims to  
8 minimize, as much as practical, the risk that the  
9 public would be exposed to as a result of Ontario  
10 Hydro's activities.

11 Now, government regulations exist and  
12 these set out certain requirements with respect to  
13 health and safety, and in some areas these are  
14 supplemented by Ontario Hydro's standards, and together  
15 these requirements and standards help ensure that an  
16 option is meeting an acceptable level of safety.

17 So as a planner we rely only on those  
18 options which we considered to be acceptably safe, and  
19 beyond that point we don't use the safety criterion to  
20 make comparisons between options. We find the other  
21 criteria are more useful in making distinctions between  
22 the options and subsequently between plans.

23 Now, there are residual impacts and we  
24 recognize that, and some of those have been covered in  
25 the previous panels dealing with the options, but Hydro

1 does not stop considering safety once we have taken an  
2 option and put it into our demand/supply plans. Safety  
3 is considered at the siting stage in the construction  
4 of a facility, in its design as well, and in the  
5 operation of the facility. Essentially safety is an  
6 ongoing consideration.

7 Q. Perhaps you could just briefly  
8 describe the safety characteristics, some of the safety  
9 characteristics associated with the different options?

10 A. Essentially all of the options  
11 require certain health and safety requirements to be  
12 met. For example, demand management options make use  
13 of electrical equipment. All electrical equipment in  
14 the province must meet safety standards as set out in  
15 the electrical safety code of the Province of Ontario.  
16 So typically with demand management, safety measures  
17 are required in the manufacturing of equipment and in  
18 its installation.

19 Turning to non-utility generation, the  
20 non-utility generators must meet certain health and  
21 safety requirements.

22 Essentially all of the supply options  
23 require worker health and safety measures, in the  
24 manufacturing of the various station components and in  
25 their assembly in the construction phase and in the



1 operation phase.

2 Each of the supply options have unique  
3 characteristics, and just running through those very  
4 quickly, the hydroelectric option, for example, there  
5 are certain precautions that must be taken due to the  
6 dangers of fast moving water, and as described in Panel  
7 6 there is also the potential when new reservoirs are  
8 being created that the fish in those reservoirs may end  
9 up having higher levels of methyl mercury. And with  
10 transmission options, they cross several different  
11 kinds of environments, and normal precautions are  
12 required to ensure compatible uses, and that was  
13 addressed in Panel 7.

14 The fossil options result in high levels  
15 of air emissions compared to most of the other options,  
16 and there is a potential for public health impacts as a  
17 result of that. And we recognize to the extent that  
18 environmental controls are added, that there may be  
19 improvements, or the potential for health impacts may  
20 be reduced.

21 And likewise with the nuclear option,  
22 there are radioactive emissions which have the  
23 potential to impact on human health, and Panel 9 has  
24 described the safety measures that are taken into  
25 account to ensure that Hydro is meeting or bettering



1 regulations.

2 Q. Could you briefly then just summarize  
3 Hydro's view with respect to the safety of the options  
4 that are being considered?

5 A. We recognize that the options are all  
6 different and that they do have different residual  
7 impacts, but nevertheless Hydro believes that all of  
8 these options are acceptably safe for both the worker  
9 and the public.

10 Q. All right. I would like to turn then  
11 to you, Ms. Howes, and deal with some of the  
12 environmental comparisons of the options, and ask you  
13 first to describe the environmental criteria which were  
14 used to compare the various options.

15 MS. HOWES: A. I would be referring to  
16 the environmental characteristics tables in Exhibit 646  
17 and the specific pages are B2 to B6.

18 Now, these five tables summarize  
19 information that was provided on previous panels and  
20 they are in the environmental characteristics of the  
21 options during the operation phase.

22 If I could just orient you to these  
23 tables. Across the top of all the tables are the  
24 environmental criteria that were considered. So under  
25 air emissions, for example, there are columns for

1 SO(2), for NOx, for CO(2), for radionuclides, for trace  
2 elements and particulates.

3 The next table deals with water  
4 effluents, and the columns are thermal discharge and  
5 radioactive emissions.

6 The next table deals with wastes, and the  
7 columns are ash, FGD, radioactive wastes. And there is  
8 another category, under resource use the columns are  
9 coal, oil, gas, uranium, cooling water, and there is  
10 another column.

11 The final table deals with land use, the  
12 columns are land for wastes, station area and mining  
13 area.

14 Q. Now, I take it you will be using  
15 these to highlight some of the environmental advantages  
16 and disadvantages that you see with each of the options  
17 and you have sort of got to pick one to use as a  
18 baseline, and I understand you have done that; is that  
19 correct?

20 A. Yes, I have, and the basis for  
21 comparison will be, all of the options will be compared  
22 against a new CSC or conventional steam cycle option  
23 with FGD and SCR.

24 Q. FGD, flue gas desulphurization?

25 A. Flue gas desulphurization.

1 Q. And SCR?

2 A. Selected catalytic reduction.

3 Q. And the CSC is of course a fossil  
4 option.

5 A. That's right.

6 If you could indulge me, Mr. Campbell,  
7 there is an errata on the air emissions table, if I  
8 could just acknowledge that. This went out in a  
9 package I believe earlier this -- at the end of last  
10 week, and the errata is on the area emissions table and  
11 it's in the column trace. The errata is for the option  
12 fossil 4 by 500 megawatt U.S. coal, CFC/FGD/SCR, the  
13 new number should be 15.87.

14 THE CHAIRMAN: Instead of?

15 MS. HOWES: .16, I believe. Yes.

16 And the next change is in the same column  
17 but for IGCC with SCR. Instead of .915, the new number  
18 should be 1.59.

19 MR. B. CAMPBELL: I believe, Mr.  
20 Chairman, an errata has gone out advising everyone of  
21 that correction. It may be that that errata has  
22 already made it into the Board's copies.

23 MS. PATTERSON: Two of them are  
24 corrected.

25 MR. B. CAMPBELL: Mr. Chairman, I am

1 about to move through a discussion of each of the  
2 options with Ms. Howes. It's a few minutes before  
3 11:30 but this might be a convenient time for the  
4 morning break.

5 THE CHAIRMAN: All right. We can take a  
6 15-minute break.

7 THE REGISTRAR: Please come to order.  
8 This hearing will recess for 15 minutes.

9 ---Recess at 11:26 a.m.

10 ---On resuming at 11:45 a.m.

11 THE REGISTRAR: Please come to order.  
12 This hearing is again in session. Be seated, please.

13 THE CHAIRMAN: Mr. Starkman?

14 MR. STARKMAN: Thank you, Mr. Chairman.

15 Mr. Campbell has just been kind enough to  
16 allow me to address the panel on an issue that is of  
17 some concern to the Coalition, and I wanted to bring to  
18 the panels's attention now before Panel 10 got further  
19 into its evidence in chief. That issue is with respect  
20 to the time frames that this panel is referring to.

21 I take it that the panel has noted that  
22 in many of the overheads and the evidence being  
23 presented there is some reference to the post 2014  
24 period.

25 THE CHAIRMAN: Where, for example?

1 MR. STARKMAN: Well, the example that I  
2 was going to draw your attention to, the most obvious  
3 one, if you turn to page 15 of Hydro's overhead  
4 exhibits, Exhibit 682, which indicates, for example,  
5 the required major new supply, that graph runs out to  
6 2017.

7 THE CHAIRMAN: All right.

8 MR. STARKMAN: The previous page, page  
9 14, all the graphs, all of the analyses runs out to the  
10 year 2017, and the data, if you look --

11 THE CHAIRMAN: Not all of them will. I  
12 see some go to 2014. I just picked one at random, page  
13 21. Page 23. I am not doing this selectively. Page  
14 24 seems to go a couple years beyond.

15 What is the concern with that?

16 MR. STARKMAN: The concern is this: When  
17 we got the supplementary witness statements which  
18 indicated runs out to the year 2017, it talks about the  
19 retirement of Bruce in 2015, it talks about having to  
20 built or bring on-line potentially several new nuclear  
21 reactors in the 2016, 2017 period, we wrote to Mr.  
22 Campbell on May 1st and copied it Ms. Morrison, asking  
23 Hydro to confirm they would not be relying on the  
24 evidence in the post 2014 period for planning purposes.  
25 They sort of indicated their models are geared to a



1 25-year period, so when they ran their models it turned  
2 out this information. So we were concerned that that  
3 information not be presented to the panel, but then we  
4 wrote and asked that Mr. Campbell confirm the  
5 information would not be relied on by this panel for  
6 planning purposes.

7 He wrote back last week, and I guess he  
8 can speak to this, saying that they would not or was  
9 not in a position to confirm that you understanding.  
10 Although he does go on to basically say that -- I could  
11 read what he said. He says:

12 The 25-year framework for planning was  
13 not the result of a fixed 2014 date.  
14 Hydro has from the beginning looked  
15 beyond the 25-year horizon to obtain a  
16 sense of the implications of the  
17 integrated set of options which make up  
18 any long-term plan. This was the case  
19 when the DSP was filed and remains the  
20 case now. That said, however, the period  
21 between 2014 has not been the principle  
22 focus of the analysis conducted and we  
23 have tried to ensure that data is  
24 regularly available at intermediate years  
25 such as 2000, 2010 and 2014.



1                   Given the time required for the  
2                   hearing process, I believe the emphasis  
3                   given to these dates throughout provides  
4                   a practical method of dealing with your  
5                   concern.

6                   Now we got that letter last week and we  
7           received their overheads this morning and we have heard  
8           the first part of their evidence and we do have a very  
9           real concern and the concern is this: The Coalition  
10          asked its interrogatories or first received funding to  
11          do analysis on the period up to 2014. The  
12          interrogatories were presented, they were answered on  
13          the period up to 2014.

14                   We have prepared our case based on an  
15          effort to ultimately demonstrate to the panel that they  
16          do not need any major new supply to the year 2014, that  
17          the electricity needs can be met primarily through DSM,  
18          perhaps through non-utility generation and some other  
19          things but no major new supply.

20                   Now, Hydro's witnesses come forward, and  
21          I just ask you to look at page 15 of Exhibit 682, and  
22          this was their preliminary evidence dealing with the  
23          required new supply. You see it's that part, and I am  
24          in the middle of the page, and if you draw a line up  
25          from 2014 to see where it comes in there, you see that

1 the pie, that's before 2015, is significantly smaller  
2 than the pie that's in the post 2014 period because of  
3 the -- it's a cone and it is expanding out like this.

4 Our concern is that this is the type of  
5 evidence that this panel has been presenting so far  
6 this morning. They are saying, well, you see to the  
7 year 2014 there is a relatively small, even based on  
8 their evidence, need for major new supply. It's in the  
9 post 2014 period that you see these cones expanding out  
10 into much bigger slices. And if you look at their  
11 prepared witness statements and the backup material in  
12 there, they talk about the requirements for major new  
13 nuclear or significant new nuclear supply based on the  
14 retirement of Bruce and other factors.

15 What I am trying to bring to your  
16 attention now is we think this is unfair, this was not  
17 the evidence presented by the first nine panels of  
18 Ontario Hydro's witnesses. We have heard the summary  
19 of these panels, no reference was made to any evidence  
20 with respect to the post 2014 period. These numbers  
21 that they use are in some ways exponential. The  
22 assumptions made in 1995, '96. '97 about the load --

23 THE CHAIRMAN: You checked, is that  
24 right, you checked the overheads in the other panels  
25 didn't go beyond that, is that what you are saying?

1 MR. STARKMAN: My recollection is --

2 THE CHAIRMAN: What is your recollection?  
3 I take it you checked that, that's accurate.

4 MR. STARKMAN: Mr. Chairman, I haven't  
5 checked every one of them.

6 What I can say is that the DSP Plan was  
7 based on 2014, our funding application was based on  
8 2014, the answers to the interrogatories were based on  
9 2014. And I believe that the evidence given for the  
10 most part, and the interrogatories, cut off at 2014.

11 Now if you ask me, did every one cut at  
12 2014, no, I am sorry I didn't check every one.

13 THE CHAIRMAN: For example, 452...

14 MS. PATTERSON: 452 cuts off at 2014.

15 THE CHAIRMAN: All right.

16 MR. STARKMAN: So the situation that we  
17 are looking at is, they bring out 452, and you have  
18 already heard all our complaints about that and the  
19 problems it's created, then they bring out the  
20 background material, the supporting data to 452, and  
21 the supporting data goes to 2017.

22 I understand Mr. Campbell saying, well,  
23 we are not focussing on that. Our position is simply,  
24 that Hydro has a position, they have a preferred plan  
25 and they are endeavouring to persuade you to move in

1       that direction, and what they have gone ahead and done  
2       to help out, help their case, is to present visual  
3       evidence which helps in that way, and to sort of not  
4       make it clear, if you like, that they are cutting it  
5       off at 2014. They are leaving the impression that it  
6       continues on beyond that, and that creates some  
7       problems.

8                       First of all, we don't have the resources  
9       and the information to do that sort of analysis; the  
10      second thing is it does raise a much larger question  
11      which is if you go beyond 2014 why do you cut it off in  
12      2017?

13                     If you project these lines out, which we  
14      have been doing, to 2020 and 2030, you see we have a  
15      very significant problem based on Hydro's analysis now.  
16      [11:55 a.m.]

17                     If you recall Mr. Burke's evidence, he  
18      said things like you can't project a load forecast like  
19      that because we haven't done the analysis beyond 2015;  
20      and what ensued was a whole discussion about why the  
21      world might change in 2015.

22                     There was or has been a thrust to cut  
23      this thing off for better or worse and we are very  
24      concerned that we get a clear direction from the panel  
25      or a clear understanding with Hydro that the matter is

1 going to be cut off at 2014 or a clear understanding  
2 from the panel that, no, they intend to potentially  
3 rely on some of this evidence or some of the  
4 suggestions beyond 2014, in which case we think we are  
5 entitled to know that now. And we will need some time  
6 and some resources to do the type of analysis to deal  
7 with how DSM is going to meet the expanding  
8 requirements beyond 2014 in order to satisfy you.

9 And I say this in the context of the  
10 scoping decision which the way we read it indicated  
11 that the panel felt that five-year plans were too rigid  
12 and that there should be some flexibility and that  
13 everything was on the table for approval.

14 And I guess we are coming back now to say  
15 time is a little shorter than it was before and we  
16 really need to know where it is this matter stops  
17 because if this hearing goes on for another year, does  
18 that mean that the 2017 becomes 2018, '19, and so on?  
19 I have made my point and that's our concern.

20 THE CHAIRMAN: You recognize two, I  
21 suppose, very obvious things. One is that the farther  
22 you go out in predicting anything the less certainty  
23 there is that you are accurately predicting because the  
24 world is changing very rapidly, as this hearing if  
25 nothing else has already demonstrated. Inside of three



1 years, there has been substantial changes in what was  
2 predicted in 1989.

3 The second thing is that the world  
4 doesn't come to an end on December 31, 2014. People  
5 have to think in longer terms than that in order to  
6 assess what should be done between now and 2014.

7 MR. STARKMAN: Well --

8 THE CHAIRMAN: Is that not right?  
9 If it's not right, tell me.

10 MR. STARKMAN: I appreciate that. I  
11 think that's a point that everyone has been making or  
12 at least has become obvious. But what I'm saying is  
13 that Hydro presented a case and there has been a  
14 discussion going on based on certain information,  
15 certain time horizons.

16 Now all of a sudden - all of a sudden  
17 meaning in the last two or three months - this time  
18 horizon has been extended --

19 THE CHAIRMAN: In the context of the  
20 planning, extending it a couple of years, do you  
21 consider that to be a significant change?

22 MR. STARKMAN: Well, I think that if you  
23 want --

24 THE CHAIRMAN: I recognize what you say  
25 about graphs, but about in the time horizon you



1 consider that a significant amount of time, given the  
2 increasing uncertainty the farther out you go?

3 MR. STARKMAN: Well, Mr. Chairman, I  
4 would say, I don't know whether it's significant or  
5 not, but I would say this about it: that it is  
6 significant in the sense from our point of view that  
7 Hydro has extended out the time horizons to the point  
8 where they are projecting retirements, major  
9 retirements of existing facilities, and are projecting,  
10 projecting that they will need significant new nuclear  
11 capacity. In other words --

12 THE CHAIRMAN: I don't understand that.  
13 They say their position at the moment, as I understand  
14 it, is there will be some need for new major supply and  
15 activity sometime around or after around 2010. And  
16 that what is going to be their position is they don't  
17 know at the moment. They have not made up their mind  
18 what it is going to be. It may be fossil, it may be  
19 nuclear, it may be some new technology that either  
20 becomes viable or comes onstream.

21 Microphone Ms. Morrison tells me.

22 MR. STARKMAN: They say under certain  
23 scenarios, sir, they might need one nuclear plant in  
24 the year 2009, bringing in-service in 2010. They also  
25 say in certain scenarios that they may need up to two

1 or three future plants coming on in 2017.

2 Now, I don't think it's any coincidence  
3 that they projected it out to capture that. I mean you  
4 can say that it is coincidental but I don't think it  
5 is. And I think if you did a detailed analysis of  
6 these graphs, you would see a significantly widening  
7 cone in the post-2014 period which I again do not think  
8 is coincidental.

9 THE CHAIRMAN: Thank you.

10 Does anybody else, any other intervenors  
11 support or oppose this position being taken by --

12 MR. GREENSPOON: Northwatch supports that  
13 position, Mr. Chairman.

14 THE CHAIRMAN: Anyone else?

15 MR. KLIPPENSTEIN: Pollution Probe has  
16 the same concern.

17 THE CHAIRMAN: Anyone else?

18 MR. MARK: Mr. Chairman, I am not sure  
19 what relief is being requested here, but I won't  
20 support the position. As I understand what Mr.  
21 Starkman is saying, he is saying --

22 THE CHAIRMAN: You will or you won't  
23 support? I didn't hear you.

24 MR. MARK: I won't support the position.

25 As I understand what Mr. Starkman is

1 saying -- I could approach the lectern if you like, Mr.  
2 Chairman.

3 Mr. Starkman is saying as if it comes as  
4 a monumental surprise that Ontario Hydro is predicting  
5 the retirement of some existing plants after the year  
6 2014. Let's just be realistic here. Everybody could  
7 calculate that. We all knew it was going to happen.

8 Hydro hasn't been presenting to 2014 and  
9 telling everybody that every plant in existence then  
10 will be in-service inevitably. They presented certain  
11 data visually to that date, but I can't understand what  
12 the complaint is. We have always been entitled, every  
13 one of us here, to ask Ontario Hydro what circumstances  
14 can you foresee in 2015 and '16 which may impact on  
15 this. Presumably the largest one, and the one Mr.  
16 Starkman referred to, being the fact that the existing  
17 units are going to be closed down after that. It's  
18 nothing new. And the fact that Hydro has done it  
19 visually here I can't imagine can be of great concern.

20 THE CHAIRMAN: Mr. Campbell.

21 MR. B. CAMPBELL: Thank you, Mr.  
22 Chairman. This matter arose in some discussions with  
23 Mr. Poch following his letter of May 1st. And I have,  
24 I think Mr. Starkman has referred to my reply. But I  
25 think I would like to place squarely before you the

1 request that was made of me by CEG in dealing with this  
2 and which I take it is now being made in front of you.

3 What I was asked was to confirm that  
4 Hydro's witnesses would not be making any reference to  
5 the past 2014 time period in presenting their evidence  
6 and would be indicating that the information offered is  
7 not relied on for planning purposes. That was the  
8 request that was given to me and that I take it is  
9 before you now.

10 I think what I would point out is that  
11 even as long ago as 1989 when this plan was published,  
12 it was quite clear, in my submission, that it was a  
13 25-year planning framework that was being adopted and  
14 there is a variety of information that has been  
15 presented about trends beyond the 25-year period  
16 because as Mr. Mark quite correctly points out, it  
17 would be foolish in the extreme not to look beyond the  
18 25-year horizon to determine what some of the  
19 implications might be of the kinds of plans that are  
20 being proposed within the 25-year period.

21 In my submission, any fair review of the  
22 documentation will indicate that that was the case when  
23 the DSP was filed and it remains the case now. Now, in  
24 my submission, it is quite -- I mean, if this was such  
25 a major concern, it should have been a major concern

1 first in 1989. It should have been a major concern  
2 certainly in dealing with the implications of the  
3 Update because we had provided LMSTM runs at that point  
4 in time when all of that was argued in front of you  
5 over the last several months that every one of them  
6 goes out to 2017.

7 I don't think it is a fair request to  
8 this Board or to Ontario Hydro to say, do your planning  
9 on the basis that the world ceases to exist as at  
10 December 31, 2014. It has not been our position  
11 previously. It is not our position now. We have  
12 chosen a 25-year horizon. There may be others in front  
13 of you who would choose a longer horizon. There are  
14 planning exercises that do look at longer horizons but  
15 I think it is important not to forget about what is  
16 happening beyond the particular period of the plan  
17 because that can inform your judgment about the plan.

18 I do think, though, that it is fair to  
19 say from Ontario Hydro's perspective that we have  
20 focussed on the years 2000, 2010, and 2014. They tend  
21 to have been focussed on over the course of the  
22 evidence. I think that is realistic and I would just  
23 point out that certainly it is Ontario Hydro's position  
24 that it is not asking this Board for approvals relating  
25 to matters coming into service beyond the year, beyond



1       that time period I think earlier than 2014 in fact. It  
2       is much earlier than that.

3               And in my submission there is no, my  
4       friend cannot possibly complain about being at any  
5       disadvantage given the long-term nature of these  
6       proceedings. It has been clear from the beginning.

7               THE CHAIRMAN: Do I understand you to  
8       say, just so there is no doubt about it, that the  
9       planning periods that we are having under consideration  
10      here does end in 2014?

11              MR. B. CAMPBELL: I think that the  
12      information that has been developed has gone out to  
13      2017. The planning framework has always been a 25-year  
14      planning framework.

15              THE CHAIRMAN: So the 25 years keeps  
16      moving along as we move along; is that what you are  
17      saying?

18              MR. B. CAMPBELL: I think one has to be  
19      prepared to look at that kind of long-term view. Yes,  
20      Mr. Chairman. I think that has been clear from the  
21      beginning.

22              THE CHAIRMAN: So that this being 1992  
23      and the Plan being in '89, we are into 2017; is that  
24      right?

25              MR. B. CAMPBELL: That's what the models,



1 all the runs have done that because it is a 25-year  
2 run.

3 Now, I think it is also fair to point  
4 that once one gets out, as I say, beyond the 2010  
5 period under any, as I understand these matters, in  
6 terms of the applications for approvals that are in  
7 front of the Board, the assumptions that are made and  
8 they are no more than that, as you correctly point out,  
9 Mr. Chairman, the assumptions that are made are not the  
10 subject of a specific request for approvals. There is  
11 no request for facilities but one has to assume beyond  
12 the time when the capability of the existing system  
13 runs out, what kinds of things one would put in place,  
14 and that's what Ontario Hydro has done because  
15 otherwise, as you point out, you sort of artificially  
16 truncate an analysis at a year and pretend that it has  
17 no implications beyond that period.

18 We have always said that it does. And  
19 the analysis, the details of the analysis have always  
20 assumed that it does, right from the beginning of this  
21 application.

22 THE CHAIRMAN: Well, I have always  
23 understood these graphs when they go beyond the  
24 five-year period are really, you can give or take a  
25 year or so either side of them in trying to interpret

1       them. That's always been my understanding from the  
2       evidence of the witnesses.

3               MR. B. CAMPBELL: Well, I think out in  
4       the time periods that we are talking about, I think  
5       that's certainly correct. You have to pick a date to  
6       feed into some of the models and so on, but I don't  
7       think there is a witness on this panel who would tell  
8       you that these things are known with precision. As you  
9       point out, they are not. That has always been the  
10      case.

11             THE CHAIRMAN: Do you have any reply  
12      submission you want to make, Mr. Starkman?

13             MR. STARKMAN: Just one comment Mr.  
14      Chairman.

15             Hydro says they are not asking for  
16      approvals but they are clearly or they started off  
17      asking for guidance. I don't really know what guidance  
18      means but in guidance discussion they wanted something,  
19      and that's what they mentioned in 452.

20             But if it's clear that the panel is not  
21      going to be commenting on options beyond the year 2010  
22      or 2014, and it is only going to be using that  
23      information or whatever evidence is presented as the  
24      form of context, I guess that's the way Hydro applies  
25      it, but they are not going to be commenting on matters

1 in those --

2 THE CHAIRMAN: You mean we can't refer to  
3 the fact that the life cycle of an existing plant runs  
4 out in 2018 or something like that. That can't be  
5 something we can pretend isn't going to happen or...

6 MR. STARKMAN: Mr. Chairman, I mean the  
7 whole question of the life cycle in the nuclear plan I  
8 think will be up for discussion. What I mean is if you  
9 are not going to be commenting on the need for new  
10 supply or the type of new supply or the approach that  
11 should be taken to determine that question out in those  
12 years, then I guess we have -- like we don't have as  
13 big a problem. But if the panel intends to comment on  
14 things in those years and as Hydro in 452 invited some  
15 sort of guidance without a time frame, now they say  
16 it's a rolling 25 years.

17 THE CHAIRMAN: This is not really reply  
18 but I guess it's your main submission or part of it.  
19 You didn't raise that and it wasn't raised by Mr.  
20 Campbell.

21 MR. STARKMAN: My main point is Hydro  
22 didn't ask for approvals but they did ask for guidance  
23 and I guess we are concerned as to what evidence the  
24 panel is going into account when they give whatever  
25 guidance they ultimately deem appropriate.

1                   THE CHAIRMAN: We are going to take into  
2                   account the characteristics of the options and their  
3                   pros and cons. I think that's certainly something we  
4                   are going to take into account, but it will have to be  
5                   based on the knowledge that exists today and what can  
6                   be reasonably be anticipated in the future.

7                   ---Off the record discussion.

8                   THE CHAIRMAN: We are of the view that  
9                   the planning period ends in 2014. It is not a creeping  
10                  barrage that extends further, and the evidence, the  
11                  detailed evidence should be restricted to the period up  
12                  to that time.

13                  That is not to say that the proponent or  
14                  any intervenor for that matter cannot in a general way  
15                  deal with what they expect to occur beyond that period  
16                  because I think it would be too restrictive. We all  
17                  think it would be too restrictive to make that kind of  
18                  Draconian cut-off. But we are dealing with a planning  
19                  period that ends in 2014 and I hope that all parties  
20                  can work comfortably within that framework.

21                  I think when Hydro gives its evidence it  
22                  probably should, because there is I think Mr.  
23                  Starkman's point is well taken, at least in 15 there is  
24                  a significant change beyond the 2014 period. Whereas I  
25                  will not restrict Hydro from giving some evidence about

1       that, detailed analysis of it I think should end in  
2       2014.

3                       Can you live with that, Mr. Campbell?

4                       MR. B. CAMPBELL: I just want to find out  
5       if I can.

6       [12:15 p.m.]

7                       THE CHAIRMAN: As Dr. Connell reminds me,  
8       it went out to 10,000 years in the radioactive effects.  
9       So we haven't been all that restrictive.

10                      MR. B. CAMPBELL: I think the simple  
11       answer to your question is yes, Mr. Chairman, that's a  
12       major problem. We have done all the LMSTM runs that we  
13       have been providing since January, many of which were  
14       provided in February. This is not news to anybody.  
15       All of the costing that's been provided with respect to  
16       the Update, we have been answering interrogatories with  
17       respect to the Update, with respect to all of that,  
18       certainly the vast bulk of that, the information has  
19       been calculated on the 25-year planning horizon that  
20       runs to 2017. We have been asked for the runs, that's  
21       what we have provided.

22                      THE CHAIRMAN: I don't quarrel with that.  
23       But does it inhibit you in presenting the evidence that  
24       you want to present to this panel?

25                      MR. B. CAMPBELL: When we have done all



1 the calculations, for instance, comparing the costs of  
2 the plans, it's brought down to a net present value,  
3 that net present value brings forward everything that's  
4 expected to happen out to 2017. That's the way the  
5 models are run. We can't, without rerunning it, cut it  
6 off. Those numbers are there.

7 Now, as I say, this is not something that  
8 arose in May, this is something that has been clear  
9 since we started sending out the LMSTM runs after 452.  
10 It's been perfectly clear.

11 MS. PATTERSON: Since April.

12 MR. B. CAMPBELL: I appreciate that the  
13 charts, my friend Mr. Starkman is right, the charts in  
14 452 run out to 2014, and we were asked for the detailed  
15 calculations that went into the costing, and so on.  
16 All of that which was provided it's quite clear goes  
17 out to 2017.

18 ---Off the record discussion.

19 MR. B. CAMPBELL: I should have perhaps  
20 added something that of course Mr. Shepherd mentioned  
21 to me that perhaps was an additional point that should  
22 be brought to the Board's attention. The other part  
23 this of course is that for some of the calculations,  
24 they are taken right out to the end of the option's  
25 lives; for instance, the Manitoba Purchase has a period



1 at which it extends.

2 For various of the options they have  
3 always been run out to the end of the life of the  
4 option that's being proposed, and the totals that we  
5 have presented in various parts of the evidence are  
6 either specified as being totals to 2017, or totals to  
7 the end of the option's life. But the ones that go to  
8 the end of the option's life, that's always been the  
9 case again, as I say.

10 THE CHAIRMAN: I didn't take that as  
11 something that Mr. Starkman was necessarily objecting  
12 to. The farther you go out the less significance it is  
13 anyway. So that I don't know that those kind of  
14 calculations trouble him. He says no they don't.

15 MR. B. CAMPBELL: There are two aspects  
16 to this here, sort of generally where are things  
17 trending and everybody can put a page across their  
18 sheet at 2014 and that will show where the trends are  
19 as of there and ignore the rest, if you like.

20 THE CHAIRMAN: I think that's what his  
21 concern is. If you look at his exhibit, the one that  
22 he pointed out as an example, you do see a definite  
23 post 2014 trend. One of the lines take a dip and goes  
24 south, down towards the bottom. It's a very definite  
25 trend which someone is going to want to explain or want

1 to have explained, and he says that shouldn't be part  
2 of the evidence.

3 MR. B. CAMPBELL: Well, Mr. Chairman, you  
4 have my submissions on that. It is our position that  
5 looking beyond whatever the end of the planning period  
6 is has always been a consideration in planning and that  
7 you had to take those kind of things into account in  
8 making your plans. You could not blindly do a plan and  
9 assume that you shouldn't look beyond. That has been a  
10 consideration in planning, I have made my argument that  
11 it has been a consideration from the beginning.

12 What we really have trouble with though  
13 in the numbers is the numbers have been accumulated on  
14 a 25-year basis, and so where these witnesses are  
15 giving totals, they are giving totals on that basis,  
16 not simply to 2014, and for instance --

17 THE CHAIRMAN: I don't think that bothers  
18 Mr. Starkman, at least I don't think it does.

19 I think that he and others have been  
20 funded for a plan that exists to 2014. I think that he  
21 can't be expected to provide a detailed response beyond  
22 that period, that's one of the things that concerns  
23 him, they haven't been funded to do that.

24 MR. B. CAMPBELL: Well, Mr. Chairman, I  
25 guess our position on that is if they are not looking

1 in any respect beyond 2014, we will have submissions to  
2 make about the appropriateness of planning on that  
3 basis. That's one of the matters that we have said  
4 from the beginning - and this is not new - is that you  
5 have to look at the implications of those on a longer  
6 time period.

7 MS. PATTERSON: You changed the planning  
8 period in your models and that's the problem, not that  
9 you look beyond the 2014. It's that you are now doing  
10 everything up to 2014 and that's what you are relying  
11 on, so that is a difficulty for the other parties.

12 MR. B. CAMPBELL: I'm sorry, I am not -  
13 it's undoubtedly my fault - but I am not sure I take  
14 the point.

15 MS. PATTERSON: You are just arguing that  
16 we have to take into account information after the end  
17 of 2014, which is fine, but you just told us that you  
18 did your models on the basis of a 25-year planning  
19 period to 2017, which is an entirely different thing  
20 and which is the nub of the problem.

21 MR. B. CAMPBELL: Well as I say, it's my  
22 submission that the documentation is quite clear, that  
23 what Hydro -- yes, in '89 the 25-year horizon went out  
24 that far. But it can be no surprise to my friend in  
25 May, in my submission, that the analysis has

1 consistently been done on a 25-year basis. He has been  
2 sent material throughout this winter starting in  
3 January that a lot of it, it all runs out on that  
4 basis.

5 In my submission it's been quite clear  
6 from the beginning that that was the way the structure  
7 of these things was put together, that it was put  
8 together on a 25-year planning horizon.

9 I don't know what I can add to that.

10 At the end of the day, we have, as I  
11 pointed out to Mr. Poch in my correspondence and my  
12 previous discussion with him, we have focussed on  
13 certain points because they are the ones that we see as  
14 being of particular relevance in terms of the approvals  
15 that we are seeking from this Board. The only  
16 pertinence really beyond those dates is that you do  
17 have to have some of sense of the implications and of  
18 what that kind of an approach would be for the longer  
19 term period.

20 ---Off the record discussion.

21 THE CHAIRMAN: Mr. Hamer?

22 MR. HAMER: Mr. Chairman, I may have been  
23 too slow to rise when you were calling for reply to Mr.  
24 Starkman's submissions, but I do want to make two  
25 points based on your comment earlier after Mr. Campbell

1 had first replied.

2 It seems to me that many of Mr.  
3 Starkman's arguments really go to a good line of  
4 cross-examination which might affect the weight of the  
5 evidence which Hydro is attempting to adduce, but it  
6 ought not to lead to any ruling now which would be  
7 binding in future as to particularly what level of  
8 detail Hydro is permitted to go into. That's my first  
9 point.

10 My second point is that from the point  
11 of view of an intervenor like my client, it would be  
12 inappropriate rate in my submission for my client's  
13 cross-examination of Hydro's witnesses or my client's  
14 intervenor evidence to be affected in its scope by a  
15 ruling made now on the basis of the submissions which  
16 Mr. Starkman has put forward.

17 For example, there may be argument about  
18 a need date for new major supply such as nuclear. One  
19 could argue back and forth whether it should be the  
20 year 2004 or the year 2009 or the year 2016. If it is  
21 proven to the satisfaction of the Board that whatever  
22 happens you are going to need nuclear resources by the  
23 year 2030 or the year 2040, regardless of when the  
24 precise need date came in, then it would be a valid  
25 argument to be advanced at the end of the case that



1 consideration ought to be given to preserving the  
2 nuclear technology and Canada's and Ontario's  
3 involvement in that technology in the interim. If the  
4 Board were satisfied that by a certain date the world  
5 is going to need nuclear energy after all other stopgap  
6 measures have been exhausted. And I would not want a  
7 ruling this morning to prevent my client from  
8 cross-examining on points like that and my client from  
9 calling evidence on points like that. It would be most  
10 inappropriate, in my submission.

11 I suggest the best way for this to be  
12 dealt with is the way one normally does in the flow of  
13 evidence, if a question is objectionable, objection is  
14 made to it at the time the question is asked.

15 It really is impossible at this stage for  
16 the Board to make a ruling which will really be of  
17 assistance to the parties in asking specific questions  
18 further on in my respectful submission.

19 Thank you, Mr. Chairman.

20 THE CHAIRMAN: Mr. Starkman?

21 MR. STARKMAN: Mr. Chairman, I just have  
22 one point I guess in further reply.

23 It is a question of at what point you do  
24 the comparisons, I think as Ms. Patterson said. Hydro  
25 presented numbers, for a long time they did run out

1 past 2014, like they produced some incremental system  
2 values which run out to 2026 and so forth. But we  
3 always assumed that when you are doing the comparisons  
4 between the options, this was to be done in 2014. We  
5 never had any indication that Hydro was going to pick  
6 another date. We did all of our research and all of  
7 our analyses based on comparing the options in 2014.

8 What I find very troublesome, as you  
9 heard from Mr. Campbell, when our witnesses come  
10 forward with that analysis what Hydro is going to say  
11 to them is, well, yeah, but ours did it taking into  
12 account 2017 and there is no match here and they will  
13 try and suggest the evidence of our experts is not as  
14 good as theirs.

15 I would just leave it back with the  
16 Panel, if this evidence is to be of assistance to the  
17 Panel, surely we need to know what date we are doing  
18 the comparison on and not be left at end of the day  
19 with all types of squabbling about 2014 and 2017, and  
20 there are huge differences when you move those three  
21 years in terms of net present values and assumptions  
22 made about costing and so forth.

23 THE CHAIRMAN: Don't forget, the  
24 approvals are only for a much shorter period of time  
25 they are being asked for. They are only asking for

1       approvals within the so-called action plan period, not  
2       the planning period.

3               MR. STARKMAN: Well, Mr. Chairman, I  
4       don't mean to force this issue too far, but that was  
5       the type of discussion that we had in the scoping  
6       decision and what we took from it was the Panel was not  
7       prepared at that time to make any firm rulings, and I  
8       guess what I am pointing out to you in the context is  
9       that we are now another month down the road or six  
10      weeks down the road and this type of problem is coming  
11      up and we are asking for some direction and trying to  
12      point out to you the problems that we have with the  
13      type of analysis that Hydro seems to be presenting.

14             Also, and the last point is, if you  
15      listen to what AECL says, again it's part of a scoping  
16      problem. They say, well, we may want to comment on  
17      things and call evidence on things that are going to  
18      happen way beyond 2014, way beyond 2017, and if that's  
19      on the agenda, and they have the capacity to run those  
20      sorts of analysis and tables, then it is just part of  
21      in discussion.

22             Frankly, we do feel disadvantaged. I not  
23      saying we didn't receive significant amounts of  
24      funding. All I am saying is that those significant  
25      amounts of funding pale in comparison to AECL and

1 Hydro's resources and the types of analysis that they  
2 are capable of doing, and we think you should hold them  
3 to level playing field. 2014 was always understood to  
4 be, at least from our point of view at the time, when  
5 comparisons were being made.

6 THE CHAIRMAN: This is obviously a much  
7 more complex problem than I thought it was when this  
8 discussion opened up. I think we will have to take an  
9 adjournment so the Panel can discuss it, rather than  
10 conduct our deliberations in public. I think we will  
11 just have to adjourn at this point.

12 THE REGISTRAR: Please come to order.  
13 This hearing will adjourn until recalled.

14 ---Luncheon recess at 12:36 p.m.

15 ---On resuming at 2:38 p.m.

16 THE REGISTRAR: This hearing is again in  
17 session. Be seated, please.

18 THE CHAIRMAN: We discussed this morning  
19 the concern of some of the parties that the evidence  
20 that Ontario Hydro is presenting in Panel 10 and in  
21 particular in Exhibit 646 extends the projections into  
22 the future to the year 2017, which is three years  
23 longer than the period in the 1989 Demand/Supply Plan.

24 It would appear, although it may be a  
25 superficial review, that the whole of 646 has been

1 prepared on that basis. It would also appear that the  
2 planning technique at Ontario Hydro is to start with  
3 year 1 and go on for 25 years so that presumably if a  
4 document were filed a year from now it would extend out  
5 to 2018.

6 The evidence about what may happen in the  
7 future has not so far stopped at the year 2014.  
8 Examples of that abound: the LUEC analysis, the effect  
9 of emissions, particularly the effect of global  
10 warming, radioactivity, disposal of nuclear waste,  
11 mercury in water. There are many, many examples of  
12 where we have considered matters that may occur after  
13 the year 2014. If evidence came to us that some  
14 significant circumstance would occur around the year  
15 2020 or 2025, I think it would not be right for us in  
16 the context of what we have to do to reject that  
17 evidence. As we have said before, we are dealing with  
18 a dynamic situation and planning cannot be a static  
19 concept. We need to have the very best information  
20 that we can get from the proponent and also of course  
21 from the intervenors.

22 We in turn must do the best we can to  
23 assess how the world will look in the year 2014.  
24 Everyone, I think, would recognize that there is a  
25 tremendous amount of uncertainty about that and about



1        what will happen to our environment in the intervening  
2        years. The natural environment, the economic  
3        environment, the social environment, and the technical  
4        environment. The closer that we get to that date those  
5        uncertainties will reduce, but it's still in a very  
6        long way off in human terms.

7                    It's our view that we should not preclude  
8        ourselves or anyone else from looking beyond the date  
9        of 2014 in order to make an assessment of what the  
10       situation would be in that year. Hydro, as I have  
11       said, in its Exhibit 646 looks at the year 2017 and we  
12       would be prepared to let them continue their evidence  
13       on that basis.

14                   If any party is seriously affected or  
15       prejudiced by this circumstance, then that may be a  
16       matter for supplementary funding, although we would  
17       expect that most people engaged in these considerations  
18       would not have a great deal of difficulty.

19                   So Mr. Campbell, you can proceed.

20                   MR. B. CAMPBELL: Mr. Chairman, if the  
21       Panel could have in front of it appendix -- I think it  
22       was appendix B1 to the witness statement that Ms. Howes  
23       will be referring to.

24                   Q. Ms. Howes, I think when we left off  
25       you had described some of the environmental criteria

1 that were used to compare the options and you had  
2 explained that for the purposes of picking sort of a  
3 base from which to discuss the others you had selected  
4 a conventional steam cycle coal plant including  
5 scrubbers, that is flu gas desulphurization and  
6 selective catalytic reduction.

7 Against that background then, I want to  
8 talk about the various options. First describing,  
9 please, some of what you see as the key environmental  
10 advantages and disadvantages associated with the demand  
11 management option. And I would ask you -- we will move  
12 through these in a fairly good order.

13 MS. HOWES: A. There are a number of  
14 advantages of the energy efficiency programs over a  
15 conventional coal option. For example, there are no  
16 direct air or water emissions. Similarly the volume of  
17 waste generated by the disposal of, say, inefficient  
18 lights bulbs or refrigerators or motors and the volume  
19 of resources consumed in the production of more  
20 efficient equipment is relatively low relative to a  
21 conventional coal option.

22 Similarly the land required for waste  
23 disposal for any of these inefficient options is  
24 relatively small but some wastes may require some  
25 special handling and disposal, particularly mercury and

1 PCBs in light ballasts and CFCs associated with  
2 refrigerators.

3 The emissions, effluents, waste and  
4 resource use related to fuel switching are certainly  
5 dependent on the fuel that is being used and the  
6 efficiency of the combustion. But generally from an  
7 environmental point of view, gas would certainly be a  
8 preferred fuel over both oil and coal.

9 Q. Now how would you describe then,  
10 going to the next option, what you see as the  
11 environmental advantages and disadvantages of the  
12 non-utility generation options?

13 A. Those options would generally have  
14 environmental advantages over conventional coal-fired  
15 generation. Options such as hydraulic, waste wood, and  
16 municipal solid waste projects are renewable fuel  
17 sources unlike the coal option. However, gas which is  
18 expected to fuel most of the non-utility generation  
19 options is non-renewable and so there is from the  
20 sustainable development perspective certainly some  
21 question about its long-term use.

22 Generally, though, air emissions are  
23 lower for these options over a conventional coal  
24 option. If either waste wood or municipal solid waste  
25 is burned for its energy rather than landfilled, it

1       could be argued that these two options offer a net  
2       reduction in the production of the greenhouse gas  
3       methane.

4               There is, however, a concern with waste  
5       from municipal solid waste projects -- or, excuse me,  
6       air emissions from municipal solid waste projects, and  
7       those of concern are dioxins and furans. However,  
8       experience in Europe suggests that these emissions can  
9       be controlled with control technologies.

10              The volume of wastes from non-utility  
11       generation projects tend to be smaller than  
12       conventional coal. There is, however, a need to manage  
13       the flyash and bottom ash from municipal solid waste  
14       projects because this is probably hazardous material.

15              Relative to conventional coal, though, a  
16       gas fired CTU option would have no sulphur dioxide  
17       emissions, lower NOx emissions. That, of course, is  
18       dependent on the design but it could be significantly  
19       lower if steam injection or a control such as an SCR  
20       was installed to reduce NOx. The gas-fired CTU would  
21       have lower CO(2) emissions, lower particular emissions  
22       and no ash to manage relative to a conventional coal  
23       option. The disadvantage of that particular option,  
24       however, is that gas is also a non-renewable resource.

25              THE CHAIRMAN: Could you go just a little

1 bit slower.

2 MS. HOWES: I certainly will.

3 THE CHAIRMAN: Thank you.

4 MR. B. CAMPBELL: Q. Now, moving to the  
5 next -- I will just move you on to the next one which  
6 is alternative energy technologies and again how would  
7 you compare those on an environmental basis.

8 MS. HOWES: A. Solar and wind options  
9 tend to be cleaner during operation than a conventional  
10 coal option. There are no direct air emissions, no  
11 water effluents or waste generated during operation.  
12 However, there would be land required certainly for a  
13 wind farm. Biomass plantations are similar  
14 environmentally to wood waste projects. There are two  
15 major exceptions however and one relates to CO(2).  
16 CO(2) from biomass could potentially be zero if the  
17 forest plantation growth is roughly equivalent to the  
18 biomass being combusted. And the second point is that  
19 there is a significant land required for a forest  
20 plantation unlike the waste wood operations.

21 And the last option molten carbonated  
22 fuel cells generally are more efficient and have lower  
23 air emissions than any of the other gas-fired options  
24 on the table. The land requirement is also small. The  
25 fuel, however, is natural gas and as I have stated



1 before it's a non-renewable resource.

2 Q. Going on then to the hydraulic  
3 options.

4 A. There are a number of advantages to a  
5 hydraulic option over conventional coal. It is a  
6 renewable resource. It is indigenous to Ontario.  
7 There would be no acid gases produced and few wastes  
8 produced. The major waste would be during the  
9 construction period.

10 There are, however, some disadvantages.  
11 One would be the production of greenhouse gases such as  
12 methane and carbon dioxide, which would result from  
13 flooding for a reservoir. There is also some concern  
14 of mercury release which is likely in effective  
15 reservoir formation and the concern is the uptake of  
16 methyl mercury by fish. Reservoir flooding could also  
17 preclude other land uses; on the other hand, you could  
18 argue that there would be other land uses created as a  
19 result of reservoir formation.

20 Q. Now, I would like to turn your  
21 attention to the transmission from Manitoba. You have  
22 spoken generally about the hydraulic side. I would  
23 like you to speak about the transmission option  
24 relating to incorporating the Manitoba Purchase option.

25 A. Relatively again to a conventional

1 coal option, there would be some advantages to the  
2 transmission component. There are no direct emissions,  
3 no direct effluents, wastes or fuel required. There is  
4 however a significant land requirement in Ontario for  
5 the transmission line.

6 Q. And can you deal with the  
7 environmental advantages and disadvantages within the  
8 fossil area itself. I know that coal is not the only  
9 alternative.

10 A. No, that's correct. With respect to  
11 air emissions, generally the oil-fired CTU options have  
12 higher air emissions than the conventional coal  
13 emissions from the IGCC option and from a gas-fired CTU  
14 are generally lower than a conventional coal option.  
15 And generally the best emissions are from a  
16 combined-cycle option with SCR, generally has the  
17 lowest options, and that would be a gas-fired  
18 combined-cycle option.

19 From a cooling water perspective, cooling  
20 water and thermal discharge is highest for the  
21 conventional coal option among all of the fossil  
22 options.

23 From a waste perspective, a combined  
24 cycle -- excuse me, a conventional coal option would  
25 have the highest waste produced of all of the fossil

1 options. There would also be waste produced from an  
2 oil-fired CTU and from an IGCC facility. In the case  
3 of IGCC, this is like a glass-like slag and would have  
4 some potential for reuse.

5 Q. Ms. Howes, I think you are about to  
6 have the Chairman tell you to slow down again, so I am  
7 going to tell you first this time.

8 A. Yes, thank you, Mr. Campbell. The  
9 land requirement is highest for conventional coal and  
10 for the IGCC option.

11 Q. And could you move then to the  
12 nuclear option on an environmental basis, I guess,  
13 using CANDU as a representative nuclear option.

14 A. But obviously move slowly.

15 Relative to conventional coal, there  
16 would be no acid gases or no greenhouse gases produced  
17 from the operation of a CANDU option. There would  
18 however be radionuclides released to both air and  
19 water. Unlike a coal option, radioactive wastes and  
20 used fuel are produced and must be prudently managed  
21 for a very long period of time.

22 There is a significant cooling water  
23 requirement for the CANDU option which is greater than  
24 for a conventional coal option. Slightly more land is  
25 required for the CANDU option than for a conventional

1 coal option. This is because of the 1-kilometre  
2 exclusion zone required by AECB regulation.

3 Q. Now, Ms. Howes, I take it from the  
4 contents of the tables that are in the witness  
5 statement that if the Board wanted to get an idea of  
6 the relative quantities in each of these areas, these  
7 are described in the tables.

8 A. Yes, they are.

9 Q. Now, I guess my next question is most  
10 simply put this way. And it's what did you learn, what  
11 lessons do you take from comparing the options which  
12 were brought forward to the planning stage.

13 A. Generally there were four options.  
14 The first is that there is no one environmentally best  
15 option. All of the options have some environmental  
16 effects. It's clear that there are mitigation  
17 available to correct or offset some of the effects but  
18 there are still environmental effects.

19 Secondly, that the options produce quite  
20 different environmental effects and it makes comparison  
21 quite difficult. Unless one is comparing, for example,  
22 among the fossil options. So a comparison suggests  
23 that one is often looking at apples and oranges and it  
24 is obviously that inevitably that some environmental  
25 trade-off would have to be made.

1                   The third lesson is that our system  
2           requirement has a requirement for both peaking and base  
3           load operations which means we are going to have to  
4           choose a mix of options and we would likely have a  
5           range of environmental effects.

6                   And the fourth point is that Hydro's  
7           priority options generally have fewer environmental  
8           effects when you compare them to a major supply option  
9           like conventional coal. Certainly the demand  
10          management options are consistent with a lower energy  
11          future and will result in fewer emissions and waste  
12          produced over the longer term. The renewable option  
13          such as hydraulic and the high efficiency options like  
14          cogeneration, one of the fossil options generally offer  
15          distinct advantages from an environmental perspective  
16          over a major supply option.

17                   Q. Mr. Dalziel, I want to come back to  
18          you then on the topic of comparisons amongst options  
19          with respect to their levelized costs. And again my  
20          first question is a simple one. Simply how do you go  
21          about comparing the cost of options. Perhaps you would  
22          remind us of that.

23                   MR. DALZIEL: A. When we are looking at  
24          the cost of options, we like to make the comparison on  
25          a consistent basis and we use essentially two methods



1 to do this. One is the levelized unit energy cost, or  
2 LUECs, and the other is avoided costs. Both of these  
3 concepts were described in Panel 3.

4 Q. Perhaps I would ask you to direct the  
5 Board's attention to where the information can be found  
6 as to the comparison of the options on their cost  
7 basis.

8 A. A comparison of the options cost has  
9 been summarized in page B7 of Exhibit 646. And I will  
10 first just go over those options that use avoided cost  
11 as the basis for comparison and make a few general  
12 remarks.

13 For demand management we generally find  
14 that there is a large potential for demand management  
15 programs that have levelized life cycle costs that are  
16 less than their levelized avoided cost. So there is  
17 indeed a large potential that is economic.

18 For the non-utility generation options,  
19 we find a similar thing, that there is a large  
20 potential that can be developed up to Hydro's avoided  
21 costs. For the hydraulic options, there are a number  
22 of projects which could be developed where the  
23 levelized life cycle costs are less than the levelized  
24 avoided cost, and we find that the number of such  
25 projects does bring us to the range of megawatts of

1 1400 to 1800 megawatts. That is economic.

2 [3:00 p.m.]

3 And generally when we look at the  
4 alternative energy technologies, we find that the  
5 levelized life cycle costs are greater than the  
6 levelized avoided cost, and although there are certain  
7 options such as the wind option in certain cases where  
8 it is becoming close to being economic.

9 Q. That would be in relation, I take it,  
10 to certain specific applications?

11 A. Yes, it would.

12 Q. All right. Now what about the  
13 options for which levelized unit energy costs are  
14 calculated. How do those compare generally speaking?

15 A. Generally we find that options that  
16 use coal and uranium are most economic for the base  
17 load applications. Options that use combustion turbine  
18 units using a combination of oil and gas are most  
19 economic for the peak load applications, and that some  
20 of the intermediate load range we find that natural gas  
21 in combustion turbine units and configured as  
22 combined-cycle stations is economic as well.

23 Q. All right. And perhaps you could  
24 give, just really as a summary, an overview of the main  
25 matters you consider in comparing option costs.

1                   A. I think the main things are that we  
2 look at full life cycle costs and then we do it on a  
3 consistent basis using LUECs and avoided costs.

4                   Q. Dr. Long, I would like then to turn  
5 to you and deal with some of the corporate financial  
6 impacts that were considered in the option assessment  
7 stage of the demand/supply planning process, and I  
8 would ask you to explain how they were taken into  
9 account, to the degree they were at that stage.

10                  DR. LONG: A. Yes. Corporate financial  
11 impacts were not the direct consideration at the option  
12 assessment stage. Such assessments have to do with the  
13 impact on overall corporate financial results,  
14 therefore the main interest is in complete plans which  
15 involve --

16                  THE CHAIRMAN: Excuse me. Do you have  
17 your mike on, or is that the one that doesn't work?  
18 ---Off the record discussion.

19                  DR. LONG: As I say, the main interest is  
20 in complete plans which involve selected combinations  
21 of options and not on the effect of individual options  
22 themselves. The key financial criterion used in the  
23 demand/supply planning process is low cost to customers  
24 in the long-term, and the life cycle economic analysis  
25 of options assures this criterion is met, and this

1 subject was discussed at length by Panel 3 and also  
2 just dealt with by Mr. Dalziel.

3 Having said this, it's clear that because  
4 plans involve or equal the sum of options, the  
5 financial characteristics of individual options do  
6 affect the financial results that flow from the plans.  
7 The impact of an option on financial results depends on  
8 annual cash flows over time as well as how these costs  
9 are funded and accounted for.

10 Hydro has only two sources of funds,  
11 revenues and borrowing.

12 Options are financed through rates or  
13 borrowing to varying degrees over their lifetime and  
14 how they are financed in this way is determined by  
15 Hydro's financial policies and this in turn is what  
16 determines their impact on financial results.

17 Q. Now, what is it about an option that  
18 determines how it is financed and what its impact is on  
19 financial results?

20 A. To answer this question it is  
21 necessary to consider a cornerstone of Hydro's  
22 financial policies and that's concept of matching.  
23 What I mean by that is only charging customers through  
24 rates for facilities and services for which they are  
25 benefiting. There are certain costs including those

1 for generation that Hydro incurs today which either  
2 benefits tomorrow's customers or either benefits  
3 today's customers, as well as customers in the future.

4 In order to facilitate matching, such  
5 costs are financed through borrowing and then allocated  
6 to those customers that benefit through interest and  
7 depreciation charges included in their rates.

8 Upfront capital costs either for the  
9 construction or the acquisition of facilities or in the  
10 form of incentives are the single biggest cost item  
11 associated with an option that's financed through  
12 borrowing. Most other costs associated with the  
13 options are expensed, that is charged directly through  
14 the rates.

15 As described by Mr. Cowan on Panel 3,  
16 depreciation and interest charges give rise to a  
17 declining real accounting cost associated with an  
18 option due to the decline in capital balance. That is,  
19 real accounting costs are higher in the beginning for  
20 an option that has upfront capital costs, and this  
21 initial impact will be higher the more capital  
22 intensive the option is. Once again I would add, it's  
23 the accounting cost of an option that determines how it  
24 will impact on rates.

25 Q. In considering the range of system



1 options available to Hydro, how would you characterize  
2 the financial impact of the various demand and supply  
3 options?

4 A. A summary of the financial impacts of  
5 the various options is given in the table titled  
6 Financial Impacts included in the witness statement.  
7 This is Exhibit 646, attachment B, page B-8. Let me  
8 begin with Hydro's supply options.

9 The most capital intensive supply options  
10 are nuclear and hydraulic, and at the other end of the  
11 range we have some fossil options such as CTUs. The  
12 nuclear and hydraulic options will have relatively high  
13 initial rate impacts as I have just described, compared  
14 to fossil options. These initial high rate impacts  
15 then decline over time and the impact on rates of a  
16 capital intensive option can cross over those of a less  
17 capital intensive option so in later years of the  
18 service lives capital intensive options may have lower  
19 rate impacts than say fossil options which are less  
20 capital intensive.

21 The borrowing impacts associated with  
22 options follows directly from the original capital  
23 costs offset by subsequent depreciation charges, so  
24 nuclear and hydraulic options are characterized by  
25 relatively high borrowing requirements, say, compared

1 to fossil options, and generally higher outstanding  
2 debt levels over their service lives.

3 Q. Looked at in a similar manner what  
4 are the financial impacts associated with non-utility  
5 generation options?

6 A. The effect on rates of non-utility  
7 generation options is mainly due to the purchase price  
8 which is charged directly to rates. Also depending on  
9 the particular contract, there may also be some initial  
10 financial assistance to the non-utility generator such  
11 as in the form of low interest loans or some front end  
12 loading of the purchase price. This will have the same  
13 impact on rates as the option having some capital  
14 intensity.

15 The overall rate impact in any year will  
16 be determined by the difference between the purchase  
17 cost, including the effect of the incentive, compared  
18 to the accounting cost displaced by the non-utility  
19 generation purchase.

20 Generally, non-utility generation options  
21 don't involve any upfront capital, therefore they  
22 result in no borrowing impacts for Hydro.

23 Q. And could you deal with, again, the  
24 financial impact of the Manitoba Purchase?

25 A. Yes. The rate impact is similar to

1 that for a non-utility generator in that the impact is  
2 mostly due to the purchase price which is passed  
3 directly through to rates. You will recall from Panel  
4 7 evidence that the contracted purchase price for the  
5 Manitoba Purchase is initially front end loading.

6 The option also has some net transmission  
7 capital associated with it and this will add some  
8 capital intensity to the option. The overall rate  
9 impact will be defined by the purchase cost plus the  
10 accounting cost of the transmission, less the  
11 accounting cost displaced by the purchase.

12 In this case there will also be a  
13 borrowing impact resulting from the additional  
14 transmission requirements needed to accommodate the  
15 purchase.

16 Details of these impacts can be found in  
17 transcript Undertaking 442.7, which deals with the  
18 re-evaluation of the Manitoba Purchase. I will also be  
19 dealing with this subject a little later my evidence as  
20 well.

21 Q. I guess finally in this area could  
22 you comment on the financial impact of demand  
23 management options?

24 A. The financial impact of demand  
25 management options results from the impact of the

1 options on costs and revenues. Since these options  
2 reduce or shift demand, there is a reduction in  
3 revenue.

4 The demand management program also  
5 involves administration costs which are expensed and  
6 may involve some incentives which are capitalized and  
7 then amortized to rates over the expected benefit  
8 period of the option.

9 These effects are offset by lower fuel  
10 costs, again resulting from the reduction in demand, as  
11 well as the deferral of costs of new supply.

12 Overall, the cost charged to rates as a  
13 result of demand management options may be higher,  
14 especially in the early stages of an option, and these  
15 costs are spread over fewer kilowatts and  
16 kilowatthours, and this has a tendency to increase  
17 rates. Indeed, there is no guarantee that the  
18 long-term rates will be lower than demand management  
19 options. The goal of the program is not to lower rates  
20 but rather to promote more efficient use which will  
21 result in lower total customer bills.

22 Q. So that for a customer who sort of  
23 looks at his rates only in terms of the bottom line of  
24 the bill, although technically the actual rate, as I  
25 understand it, may not be lower, you can expect over

1 time for the bill to be lower.

2 A. That's correct.

3 Q. And then borrowing requirements in  
4 relation to this option?

5 A. As I mentioned, some demand  
6 management options involve incentives, and this will  
7 result in some borrowing for Hydro. In fact, for the  
8 program as a whole it may involve fairly high levels of  
9 borrowing. These will be offset at some point by lower  
10 borrowing due to the deferral of major supply  
11 facilities as a result of the demand management program  
12 itself.

13 Q. All right. I would like to turn  
14 then, Dr. Tennyson, to your area, and ask you to  
15 outline the social environment criteria that were used  
16 in comparing the various options.

17 DR. TENNYSON: The social environmental  
18 criteria that are identified and used in Exhibit 464 as  
19 shown in attachment B, pages B9 to 14, are based on the  
20 criteria used in the environmental analysis. There  
21 were two categories; namely, socio-economic effects and  
22 societal considerations.

23 Socio-economic effects included regional  
24 employment, regional economic development and local  
25 community impacts.



1                   Societal considerations included social  
2           acceptance, special sensitive groups, lifestyle  
3           impacts, and distribution of risks and benefits.

4                   These criteria were developed based on a  
5           number of Ontario Hydro and other reports and they  
6           represent broad areas of potential impact and concern.

7                   In addition, during the review of the  
8           draft demand/supply planning strategy, various  
9           government Ministry's recommended the use of the  
10          criterion of social acceptance.

11                  The comparison of options is based on  
12          four broad criteria encompassing these earlier ones;  
13          namely, (1) social acceptance; (2) employment and  
14          regional economic development; (3) local community  
15          impacts, including special sensitive groups and  
16          lifestyle impacts, and (4) distribution of risks and  
17          benefits.

18                  These latter comprise the other social  
19          considerations that were identified in the secondary  
20          criteria discussed by Mr. Snelson.

21                  Q.   And what were the main findings  
22          concerning the social acceptability of the various  
23          options to deal with your first of the four broad  
24          criteria?

25                  A.   With respect to the social acceptance

1 of demand management, public support for aggressive  
2 demand management is stronger than ever.

3 While non-utility generation is  
4 considered an acceptable supply option by the public,  
5 hydroelectric development is seen by the public as  
6 somewhat more environmentally benign than other supply  
7 options.

8 With respect to the hydroelectric option,  
9 the rehabilitation or redevelopment of existing  
10 stations is preferred by the public over development of  
11 new sites because of natural environmental and social  
12 impacts. There are also concerns about impacts on  
13 Aboriginal people and cumulative effects.

14 With respect to alternative energy, the  
15 public has indicated that Ontario Hydro should place  
16 greater emphasis on the development and use of  
17 alternative technologies.

18 For the transmission associated with the  
19 Manitoba Purchase, concerns remain about exporting  
20 jobs, the reliability of the purchase, the land use  
21 impacts and electromagnetic field affects associated  
22 with transmission lines and out-of-province  
23 environmental effects.

24 For the fossil option, there is growing  
25 concern over fossil fuel because of greenhouse gas and

1 acid gas issues, and natural gas is preferred by the  
2 public over oil and coal for fossil fuel generation.

3 With respect to the nuclear option,  
4 because of concerns about global warming and acid gases  
5 it is seen by some members of the public to have some  
6 advantage over fossil in this respect. However, the  
7 nuclear option remains controversial, largely because  
8 of radioactive waste disposal and safety issues.

9 Q. I think your next broad category was  
10 employment and regional economic development, perhaps  
11 you could speak to that.

12 A. Generally the nuclear option requires  
13 the highest employment levels. New sites and northern  
14 projects which require site development and expansion  
15 of infrastructure and regional businesses and services  
16 will generate more employment and regional economic  
17 development and expansion of capacity at existing  
18 sites.

19 Q. And with respect to local community  
20 impacts?

21 A. Local community impacts will vary  
22 according to project characteristics; for example, a  
23 redevelopment or the development of a new site and the  
24 location, size, servicing capacity, infrastructure and  
25 character of local communities.

1                   There may be significant potential  
2     impacts on local communities from the in-migration of  
3     workers and their families particularly for large  
4     generation facilities associated with hydroelectric,  
5     fossil and nuclear options; therefore, a variety of  
6     impact management measures will be required to minimize  
7     and offset potentially negative impacts and enhance  
8     positive ones.

9                   Q. I think the next factor was the  
10    distribution of risks and benefits.

11                  A. Okay. With respect to the  
12    distribution of risks and benefits, for most options  
13    the local impacts of facilities may be considered  
14    inequitable if there are no offsetting benefits.

15                  Q. Now, Mr. Snelson, I would like to  
16    turn then to you for the next set of criteria which  
17    relate to technical soundness, and again I would ask  
18    you to indicate in summary fashion the main points of  
19    comparison for options as far as technical soundness is  
20    concerned.

21                  MR. SNELSON: A. By technical soundness,  
22    in its sort of simplest terms, what we mean is will it  
23    work, will it produce electricity, is it commercially  
24    developed sufficient to make a significant application  
25    that will make a material difference to the system in a

1 reasonable time.

2 Now these ideas when you start to expand  
3 them from the very simple idea, become difficult to  
4 separate in some respects from economic considerations.

5 The technical soundness is summarized on  
6 a table which is page B15, of Exhibit 646. Basically,  
7 all of the options are reasonably technically sound,  
8 otherwise we wouldn't be considering them as options.

9 Also, all of the options incorporate to  
10 some degree the likelihood that there will be some  
11 technological developments and some new technologies  
12 incorporated.

13 For planning we try to rely on options  
14 that are known to be sound with today's technology, and  
15 we have to be prepared so that we can adopt new  
16 technology as and when it develops.

17 A few comments on specific options. The  
18 major supply options use mostly proven technology.  
19 With respect to coal, and I am commenting here  
20 particularly on the conventional steam cycle coal  
21 plants which are fundamentally similar to the plants  
22 that we already have, these have well proven  
23 technologies with respect to the components that  
24 produce electricity. If there are elements of new  
25 technology, they are mostly in the area of air emission



1 controls, and there are some new technologies coming  
2 along which we will relying upon, particularly for NOx  
3 control.

4 The integrated gasification  
5 combined-cycle is another method of burning coal. It's  
6 technically sound in that it uses all proven components  
7 and it has been demonstrated; however, there hasn't  
8 been any long-term, large scale experience with the  
9 technology with all the components put together in that  
10 way.

11 [3:18 p.m]

12 With regard to nuclear technology, then,  
13 the CANDU technology has been proven in Ontario but as  
14 you are I'm sure aware, we are having some technical  
15 problems at Darlington and we are developing some  
16 solutions.

17 With respect to long-term waste disposal  
18 of the used fuel, then this is an area where there is a  
19 concept but not yet a facility, and that concept is  
20 under review by a federal process.

21 Coming back to the top of the table and  
22 referring to the demand management options, the demand  
23 management programs generally rely on proven  
24 technologies, technologies that have been demonstrated  
25 technically to be able to save electricity.

1                   There are uncertainties surrounding the  
2                   demand management program but they tend to relate more  
3                   to program effectiveness, penetration rates, how people  
4                   will use and whether they will take up on the programs.

5                   In the alternative energy area, these are  
6                   generally technically proven methods of producing  
7                   electricity; however, further technical improvements  
8                   are being sought for quite a number of these  
9                   technologies so as to reduce costs to levels where they  
10                  can compete and where they are suitable for large-scale  
11                  commercial use.

12                  Q.   Mr. Shalaby, if I could come back to  
13                  you then for a moment. I would ask you to again  
14                  compare the options in terms of the question of whether  
15                  they are available in sufficient quantity to rely on  
16                  for planning purposes.

17                  MR. SHALABY: A. The two pages that I  
18                  have referred to are pages B16 and B17 in Exhibit 646.

19                  THE CHAIRMAN: B17 in mine is pretty  
20                  faint.

21                  MR. SHALABY: B17 and B18 were faded and  
22                  were supplied in the errata package.

23                  THE CHAIRMAN: I'm the only one that  
24                  doesn't have the errata package I guess.

25                  MR. SHALABY: The toner ran out

1 considerably on the flexibility page.

2 THE CHAIRMAN: Don't worry about it. I  
3 will have it fixed.

4 MR. B. CAMPBELL: Q. Mr. Shalaby.

5 MR. SHALABY: A. On potential quantity,  
6 there are substantial quantities available generally of  
7 all the options with some exceptions. So, for example,  
8 in demand management, we saw the large quantities  
9 available in the energy efficiency improvement area.  
10 Most electricity applications can be made more  
11 efficient.

12 The limitations come in the area of how  
13 quickly can we achieve those improvements and how  
14 economical are those improvements. Other areas of  
15 demand management are a bit more limited such as fuel  
16 switching, for example. A large potential but a finite  
17 potential. How much can you switch water heaters that  
18 are electrically heated, for example, to other fuels.  
19 And the other two areas of demand management are  
20 limited by the need for the system and how useful they  
21 are for the system, and those other two areas are load  
22 shifting and discount demand service.

23 If I move over to the non-utility  
24 generation area, generally a large potential in areas  
25 like the major supply non-utility generation, but

1 limited potential in the area of cogeneration. And it  
2 is limited by the need for steam in major industrial  
3 applications and commercial applications.

4 Hydraulic. A large potential but it's  
5 limited, as Panel 6 explained, by technical and by  
6 environmental and economic considerations. Alternative  
7 technologies generally have a very large potential as  
8 well. Perhaps with the exception of municipal solid  
9 wastes where we have a limited resource. Fossil and  
10 nuclear have large quantities of primary energy. Large  
11 amounts of fuel available.

12 So in conclusion when we have large  
13 availability, the resource availability exceeds the  
14 requirements that we are looking at over the next  
15 several years and it really becomes a matter of  
16 selection and priorities and choices to be made  
17 according to the criteria that we spoke of earlier  
18 today.

19 Q. All right. And Mr. Shalaby, if I can  
20 ask you to move on and discuss flexibility, can you  
21 give us some of the conclusions in that area.

22 A. Under the heading of flexibility, on  
23 page B17, we discuss flexibility under operational  
24 flexibility and planning flexibility. The right-hand  
25 column is planning and the middle column on that page

1 is headed "Operational Flexibility".

2 And what we intended to show here is the  
3 flexibility that exists before acquiring the option;  
4 that is, addressed under planning flexibility. And  
5 then the flexibility that is available to the power  
6 system once the option is acquired, and that's called  
7 the operational flexibility.

8 From a planning point of view and I don't  
9 intend to go through all the categories one by one, we  
10 see that oil and gas options, whether they be major  
11 supply NUGs or cogeneration NUGs or combined cycles or  
12 CTUs owned by the utility, that family of options  
13 offers significant flexibility to the utility,  
14 primarily because of the short lead time associated  
15 with it.

16 Most of the other options either have a  
17 very long lead time or require sustained continuous  
18 effort. For example, efficiency improvement. They  
19 could have a short lead time but you really have to  
20 build up programs and sustain the effort for a long  
21 duration to achieve the results that are required of  
22 it. So in a nutshell we see the oil- and gas-fired  
23 options to be the providers of flexibility on this  
24 page.

25 This is now flexibility on the upside.



1 If we needed more options, the oil and gas options come  
2 to play. If we needed less options, we see the  
3 existing fossil plant to be a provider of that  
4 flexibility in the sense of existing fossil plant can  
5 be mothballed, can be taken out of service and  
6 mothballed. Or perhaps commitments to combustion  
7 turbine units or non-utility generation that is not yet  
8 on line and has not yet been contracted, commitments to  
9 that kind of generation can be delayed.

10 So that's the conclusion I draw from  
11 looking at the flexibility characteristics of all the  
12 options on page B17.

13 Q. I'll come back to you then, Mr.  
14 Snelson, and ask you to deal with the main points with  
15 respect to an option comparison with respect to  
16 resource preference.

17 MR. SNELSON: A. The demand/supply  
18 planning strategy discusses preferences based upon the  
19 nature of the primary energy source. Renewable energy  
20 efficiency and waste fuels are considered to be the  
21 highest priority. Among the non-renewable fuels, there  
22 is some preference for coal and uranium because they  
23 are more plentiful over the more limited fuels, oil and  
24 gas, which have somewhat more limited supply.

25 Now, this last point is somewhat reduced

1 because of current market conditions but doesn't  
2 completely eliminate that preference over a long-term  
3 planning perspective.

4 We also in the strategy have preferences  
5 for Ontario primary energy resources over other  
6 Canadian resources which are in turn preferred over  
7 resources from outside of Canada. And the strategy  
8 also states preference for high-efficiency conversion  
9 processes such as cogeneration.

10 Now the resource preference table which  
11 is page B18 of Exhibit 646 has some comments on the  
12 preferences for all options under these categories.  
13 Options such as energy efficiency improvements in  
14 hydroelectric are preferred on all counts.

15 Other options have some but not all of  
16 the preferred characteristics. For example,  
17 cogeneration uses a Canadian resource. It uses a high  
18 efficiency but it uses a limited resource. Also for  
19 some options these preferences which are on an energy  
20 basis are not really applicable. For instance, the  
21 load shifting and discount demand service options which  
22 are part of demand management affect capacity needs but  
23 do not have much effect upon the energy and the primary  
24 energy required of the system.

25 The table also notes for some options

1 some other characteristics of the primary energy  
2 resource. For instance, the solar, wind and  
3 hydroelectric it notes that the energy source is  
4 inherently variable depending on some natural  
5 time-varying processes.

6 In the case of hydroelectric, with water  
7 storage we can provide some degree of control over when  
8 that energy is released.

9 Q. Mr. Chairman, if this is a convenient  
10 time to take the -- I think this is the usual time for  
11 the afternoon break and this would be a convenient  
12 time.

13 THE CHAIRMAN: We will take a 15-minute  
14 break.

15 THE REGISTRAR: Please come to order.  
16 This hearing will recess for 15 minutes.

17 ---Recess at 3:30 p.m.

18 ---On resuming at 3:50 p.m.

19 THE REGISTRAR: This hearing is again in  
20 session. Be seated, please.

21 THE CHAIRMAN: Mr. Campbell.

22 MR. B. CAMPBELL: Thank you, Mr.  
23 Chairman.

24 Q. Panel, I want to turn now to some  
25 discussion of how you assign a role to options in

1 planning, and I guess my question is to you, Mr.  
2 Snelson. Against the overview of the comparison of  
3 options, could you summarize what you see as the role  
4 for each option in planning, and I am going to ask you  
5 to start with demand management options.

6 MR. SNELSON: A. The demand management  
7 options, in particular the energy efficiency and fuel  
8 switching options, reduce both peak and energy demands.  
9 And load shifting and discount demand service reduces  
10 just the peak demands but not the energy.

11 These options are generally preferred in  
12 our planning, largely because they have less  
13 environmental impact, and our approach is to fully use  
14 them to the extent that they are economic to defer  
15 major supply and to reduce emissions.

16 Q. And the role of non-utility  
17 generation in planning?

18 A. With respect to the non-utility  
19 generation, particularly that from renewable and  
20 high-efficiency cogeneration, this is a preferred  
21 option, again largely for environmental reasons and  
22 resource use reasons. And like the demand management  
23 options, they will tend to be developed to the extent  
24 that they are economic to defer major supply.

25 There is also non-utility generation

1 which in most of the proposals we have seen uses  
2 combined-cycle gas type of technology. And I'm  
3 including here combined-cycle proposals with a very  
4 small cogeneration component, much larger than the  
5 equivalent heat demand.

6 These types of NUGs we are calling major  
7 supply NUGs. They are becoming more economical sources  
8 of power and we expect them to stay that way if gas  
9 prices stay low. They tend to have quite short lead  
10 times and burning gas has lower air emissions than  
11 other fossil fuels and the potential is quite large.  
12 Because of that, these options need to be scheduled to  
13 meet the varying need. They can provide a substantial  
14 part of the protection against higher load growth or  
15 higher needs for resources for whatever reason. And we  
16 are relying on this protection in the short term and  
17 they may make significant contributions in the long  
18 term as well.

19 In many respects, these technologies are  
20 similar to Ontario Hydro's fossil options. We refer  
21 them to major supply NUGs and from a planning  
22 perspective they should be treated in similar ways.

23 Q. Now, I guess you are part of Panel 6  
24 and I would ask you to summarize the role of the  
25 hydraulic options as you look to combining options into



1 plans.

2 A. Well, we have indicated that we have  
3 a preference for hydraulic option, hydraulic options,  
4 because of the renewable energy, because it is  
5 indigenous to Ontario. It is also an option which is  
6 subject to some technical and social environmental  
7 factors that limit the attainable potential. So from a  
8 planning perspective we believe that the attainable  
9 potential should be developed in an orderly way to  
10 obtain the significant long-term benefits.

11 Q. Turning then to what I refer to as  
12 alternative energy options, again what are the  
13 considerations when you are looking at combining them  
14 into plans?

15 A. Based on the current state of the  
16 technologies, then these alternative technologies are  
17 expected to be used for a relatively small number of  
18 particular applications. These are applications for  
19 which they are most suitable.

20 Research and development is continuing in  
21 these areas and may lead to some lowering of cost and  
22 the lowering of cost may be sufficient together with  
23 other improvements such that large-scale application  
24 could start within 25 years. If these options become  
25 available on a commercial scale, they can be used later

1 in the planning period to further defer the need for  
2 major supply.

3 Q. And what do you see as the role in  
4 planning of the purchase option.

5 A. The Manitoba Purchase provides both  
6 capacity and energy. The energy contribution is  
7 important because it is a high capacity factor and it  
8 is based on a Canadian renewable resource.

9 The associated transmission that is  
10 triggered by the Purchase also provides significant  
11 benefits in terms of improved integration of the  
12 electricity system within Ontario and opportunities for  
13 increased integration with systems to the west of  
14 Ontario.

15 Q. I would like you then to deal with  
16 the various fossil options in terms of how you see them  
17 from a planning perspective moving from options and  
18 combining elements into plans.

19 A. The fossil options cover quite a  
20 range of options, which can perform several different  
21 roles on the system. One characteristic they all have  
22 in common is that they use non-renewable fuels. The  
23 combustion turbine options are good for peaking and  
24 flexibility. Combined-cycle plant is also quite  
25 flexible but has higher efficiency which makes it more

1       suitable for an intermediate capacity factor range of  
2       use. Both of those technologies, combustion turbines  
3       and combined cycle, can run on gas which is the  
4       cleanest burning amongst the fossil fuels.

5                       Gas, as I think has been testified on  
6       Panel 8, is seen now as an affordable fuel with  
7       adequate supplies at this time forecast for at least  
8       the next 10 or 20 years. However, we do remember that  
9       they did have very high cost in the late 1970s and  
10      early 1980s and we can't completely discount the  
11      possibility that prices may turn to those sorts of  
12      levels.

13                      This gives the incentive to look at  
14      options such as coal where the fuel is more plentiful  
15      and unlikely to become exhausted. However, there are  
16      environmental concerns related to the combustion of  
17      coal. Among the coal options, the integrated  
18      gasification combined cycle can provide both a  
19      flexibility of the oil and gas options, if it's  
20      developed in stages and that would be from the initial  
21      stages of the option, and it also can preserve the  
22      flexibility to shift to coal if oil or gas becomes  
23      expensive. The conventional steam cycle plant is a  
24      well proven option for using coal which is suitable for  
25      intermediate or base load application.

1                   With respect to the coal options in  
2     general, most but not all of the environmental concerns  
3     with coal can be addressed, and I am referring here to  
4     controls such as flue gas desulphurization, selective  
5     catalytic reduction. However there are residual  
6     effects that can't be addressed among which is the  
7     emissions of CO(2). And while that may lead to some  
8     limiting of coal-fired generation in the future, we do  
9     believe that coal is such a plentiful energy source  
10    that the use of coal is likely to continue.

11                  With regard to all of these fossil  
12    options, we consider them in planning at this time to  
13    be options for the future but that they will only be  
14    developed when more preferred resources are not  
15    sufficient.

16    [4:00 p.m.]

17                  Q. All right. And moving then to the  
18    role of nuclear options again as you move from an  
19    examination option-by-option to integration into plant.

20                  A. Nuclear facilities have the sorts of  
21    characteristics that make them suitable for base load  
22    operation, of which the most important is a low fuel  
23    cost.

24                  From an environmental perspective,  
25    nuclear options introduce concerns about radioactive

1 emissions, radioactive waste management, and effects on  
2 public and worker health and safety. Panel 9 has  
3 addressed how we deal with these concerns.

4 With this particular option, conventional  
5 air emissions are not a concern.

6 In addition, nuclear technology provides  
7 access to a very large energy resource, namely uranium,  
8 and this energy resource is indigenous to Canada, and  
9 because it has few competing uses, it is not subject to  
10 the fluctuations of world markets in the same way that  
11 oil and gas are.

12 Like the fossil options, new nuclear  
13 plant is considered to be an option for the future but  
14 will only be developed when other preferred resources  
15 not sufficient.

16 Q. When you are faced with the a  
17 preferred options not being sufficient, does Ontario  
18 Hydro have a preference for fossil or nuclear for base  
19 load applications?

20 A. No, at this time we do not have a  
21 clear preference. This was discussed to some extent by  
22 Panels 8 and 9 under cross-examination where both  
23 panels dealt with the question from the limited  
24 perspective of people concerned with those specific  
25 technologies.



1                   From a planning perspective then we have  
2                   to address a broader range of issues.

3                   At the time of producing the 1989  
4                   Demand/Supply Plan, a choice had to be made about major  
5                   supply options to plan for, for soon after the year  
6                   2000, and we felt we had to make a choice, that we  
7                   couldn't put off making a choice. The plan that we  
8                   recommended at that time, Plan 15, effectively  
9                   indicates that at that time we did have a preference  
10                  for nuclear over coal for base load application, and  
11                  that too was to be used after all the preferred  
12                  resources had been utilized.

13                  With today's circumstances, there is a  
14                  very different set of views from a planning  
15                  perspective. The first and most important point is  
16                  that the need for major supply has shifted off under  
17                  median load growth to a time that is far enough off  
18                  into the future that we don't need to make a decision  
19                  now. We can afford to wait. And therefore, it would  
20                  be bad planning to make a decision before a decision is  
21                  required.

22                  The delay in making such a decision and  
23                  stating a preference is also consistent with  
24                  uncertainties in three particular areas. The first  
25                  area is that there have been some continuing shifts in

1 fundamental economic trends that affect the economics  
2 of nuclear relative to coal.

3 For instance, the real costs of capital  
4 have been tending to rise through the 1980s, and have  
5 continued to rise since the 1989 plan. In addition,  
6 the real cost of fossil fuels declined through the  
7 second half of the 1980s, and is now not forecast to  
8 rise as fast as it was previously forecast to rise.  
9 Both of these trends tend to reduce the economic  
10 advantage of nuclear.

11 The second area is that there have been  
12 some less than desirable levels of performance from  
13 nuclear plant, that includes both the performance of  
14 the existing system, and also the difficulties in  
15 achieving full production from the Darlington plant.

16 Now, we do expect to solve these problems  
17 but it's prudent not to have to make decisions on  
18 whether or not to increase nuclear capacity until we  
19 have those solutions, and we have had time to reassess  
20 the situation.

21 The third area where there is some  
22 uncertainty is with respect to public policy, and there  
23 are indications that early nuclear development would  
24 not be consistent with government policy, the  
25 provincial government, and we consider that the

1 provincial moratorium on nuclear pre-engineering to be  
2 an indication of that.

3 Q. Now, against all of that background,  
4 what options have been carried forward into the process  
5 of preparing integrated plans?

6 A. All the integrated plans that we have  
7 analyzed rely on demand management, the preferred  
8 non-utility generation from cogeneration and  
9 renewables, hydroelectric, and the Manitoba Purchase.

10 When major supply is needed options  
11 considered include integrated gasification  
12 combined-cycle as a representative coal-fired option;  
13 CANDU 6 as representative of the nuclear options, in  
14 this case its representative of an option have having a  
15 shorter lead time and smaller commitment than the 4 by  
16 881 megawatts of a Darlington sized plant.

17 Combustion turbines are retained in these  
18 major supply plans for peaking with gas or oil as the  
19 fuel, and combined cycle on gas which could be provided  
20 by major supply NUGs or from Ontario Hydro is also  
21 considered as being one of the options.

22 In addition, some plans use fuel cells  
23 later in the planning period as an alternative option  
24 that is most likely to make a substantial contribution  
25 within a 25-year period.

1                   Q. All right. Now, Mr. Snelson,  
2 continuing with you, I want to move into the third  
3 general area of the panel's testimony and in  
4 particular, dealing with the planning strategy and the  
5 planning process, focussing on, as I say, how the  
6 various options are put into plans. I am going to ask  
7 you to outline the developments in the demand/supply  
8 planning process that led to the demand/supply planning  
9 strategy and to the 1989 Demand/Supply Plan. Just sort  
10 of give a quick overview of all of that, if you can,  
11 please.

12                  A. Up to the late 1970s planning was  
13 tending to focus on how we could meet the increasing  
14 demand. Our demand had been growing on average at  
15 about 7 per cent per year, we had had to construct many  
16 generating plants, and the end of this phase really was  
17 the around 19789 when we made our last major  
18 commitments to new generating plant, we committed  
19 Darlington for the east system and Atikokan for the  
20 west system.

21                  In the late 1970s load growth started to  
22 drop off, and this was following two oil crises in the  
23 1970s, and this culminated in 1981/82 recession, and  
24 through the late 1970s, early 1980, we had surplus  
25 capacity and the planning focus had to shift to how do

1 we delay our plans. In some cases we had to cancel  
2 some of our plants and we were into situations where  
3 essentially we were managing surplus.

4 By 1985 our projections were starting to  
5 indicate that new capacity might be required about the  
6 year 2000, about the turn of the century, and it was a  
7 long time since we had made any commitments to new  
8 generating plant, and in the meantime there had been  
9 some significant changes in circumstances. One of  
10 these was that any new plant would require full  
11 environmental assessments likely with environmental  
12 hearings; there was a new interest in demand  
13 management; there was an interest in non-utility  
14 generation starting to develop, and there was a greater  
15 expectation of public involvement. And it was around  
16 that time, 1985, that we started the demand/supply  
17 option study. That had two basic elements.

18 The first was a technical review of  
19 options and representative plans, and the second was a  
20 public consultation program on priorities and values  
21 which was described by Ms. Quinn in Panel 6.

22 The outcome of the demand/supply option  
23 study, and I might indicate that it had two hearings in  
24 front of the Select Committee on Energy, the outcome of  
25 all of that was the demand/supply planning strategy in



1 early 1989.

2                   Meanwhile, while all this process had  
3 been going on, the load had been growing rapidly. From  
4 1983 to 1989 we experienced the greatest absolute  
5 growth in energy and electricity demand than we had  
6 ever experienced before. And that's not in percentage  
7 terms because the base was now quite high, but in terms  
8 of megawatts and megawatthours it was the greatest  
9 growth that we had ever experienced before. And it was  
10 against this sort of background of increasing needs and  
11 a long planning process that we started to develop the  
12 1989 Demand/Supply Plan.

13                  Q. All right. And stopping there for a  
14 moment, I would like to deal with the planning strategy  
15 in some detail and ask you first to outline the  
16 structure of the strategy which I think you set out in  
17 Exhibit 74 as most people are aware of by this point in  
18 the hearing.

19                  A. Yes, the rationale for the strategy  
20 is included in that exhibit. The smallest summary of  
21 it is in the five priority strategic directions which  
22 we have already discussed, but the full strategy is  
23 quite a lot more detailed than that, and it's shown on  
24 page 18 of Exhibit 682.

25                  The strategy in total is aiming to meet

1 Ontario Hydro's obligations to meet the needs for  
2 electricity service and to meet expectations for low  
3 cost, environmental performance and other social  
4 expectations.

5 The strategy is divided up into a set of  
6 general strategic principles which apply to some degree  
7 to all options, they represent the basic values of  
8 demand/supply planning, divided into eight statements.  
9 That's important to this panel because they have broad  
10 application to many options and they have importance to  
11 the integration of the Demand/Supply Plan in total.

12 In addition to those general strategic  
13 principles, there are about 60 other strategic  
14 statements divided into a number of categories.

15 General demand/supply is one of the  
16 categories, and these are strategies that apply to more  
17 than one type of option. They cover matters such as  
18 load forecasting which was discussed in Panel 1, they  
19 talk about cost measures discussed by Panel 3, they  
20 talk about resource preferences. These strategies are  
21 also important to this panel because they have  
22 application to the integration of plans, for instance,  
23 the flexibility of the overall Demand/Supply Plan.

24 The group of strategies under the heading  
25 demand management tend to define strategies for the

1 full implementation of demand management and they were  
2 dealt with by Panel 4.

3 Non-utility generation strategies were  
4 generally dealt with by Panel 5.

5 When we come to the Ontario Hydro supply,  
6 and this includes hydraulic, fossil and nuclear, then  
7 the Panels 7, 8 and 9 have dealt with those specific  
8 aspects that deal with those specific options, and this  
9 panel must deal with those aspects that are relevant to  
10 the integration into plans, and the purchases from  
11 other utilities were discussed by Panel 7.

12 Q. Now, since an application was filed  
13 in late '89 with the Demand/Supply Plan Exhibit 3 being  
14 filed, there have been changes in the details of  
15 Hydro's plans, as everyone is aware. Are these changes  
16 generally consistent in your opinion with the  
17 demand/supply planning strategy?

18 A. Yes, I believe the changes are  
19 consistent. They are consistent with the five priority  
20 strategic directions and they are consistent with the  
21 full strategy taken in the light of the changing  
22 circumstances. And I have a number of examples, 10  
23 examples of how the application has been undertaken in  
24 the light of current circumstance and that's consistent  
25 with the strategy.

1                   The first of my examples is with regard  
2                   to greater reliance on energy efficiency standards,  
3                   which is part of the demand management program. And  
4                   the strategic element 3.12 states:

5                   Ontario Hydro will work with  
6                   governments, industry, and customers  
7                   towards developing standards for  
8                   buildings, appliances, et cetera,  
9                   including the highest electrical energy  
10                  efficiencies that are widely acceptable.

11                  And our actions in taking more reliance  
12                  on energy efficiency standards with support from  
13                  government are entirely consistent with that strategy.

14                  Another example, the second example is  
15                  that we have cut back in our plans for major supply  
16                  because of our higher estimates of demand management  
17                  and non-utility generation. And that's fully  
18                  consistent with strategy 5.1.1, which states major  
19                  increases in supply will be provided by low cost  
20                  options available to meet the need after allowing for  
21                  the effects of demand management and non-utility  
22                  generation.

23                  The third change or third area is the  
24                  application of a 10 per cent preference premium. While  
25                  the strategy doesn't discuss any specific premium for

1 preferred options, the options that the preference  
2 premium is applied to are fully consistent with those  
3 that are identified in strategy 2.4.1, as resource  
4 preferences and the premium gives substance to that  
5 strategy.

6 The fourth example is the emergence of  
7 major supply non-utility generation. This is something  
8 which was barely addressed in the strategy because it  
9 wasn't expected there would be substantial quantities  
10 that would be economic. And it's the evolution and  
11 continuation of lower natural gas prices that has  
12 resulted in them becoming more economic and that was  
13 something the strategy didn't foresee.

14 However, page 36 of Exhibit 74 gives  
15 guidelines/priorities for the application of resource  
16 preferences, and indicates a category of non-utility  
17 generation, non-renewable, non-cogeneration,  
18 non-indigenous to Ontario, which if you work it all  
19 out, adds up to major supply non-utility generation,  
20 and indicates that that has a preference comparable to  
21 Ontario Hydro's major supply.

22 Our actions on major supply NUGs are  
23 entirely consistent with this.

24 Another area, the fifth example, is fuel  
25 switching and this is also an area where the strategy



1 was silent. But we do believe that our actions in this  
2 area are consistent with the spirit of the priority  
3 strategic directions that we will aggressively pursue  
4 economic demand management options consistent with  
5 government policy. And that's consistent with  
6 government policy.

7 That last statement is not in the  
8 strategy.

9 The sixth example is with respect to the  
10 need to manage surplus. Again, circumstances have  
11 evolved that were not foreseen by the strategy. We  
12 didn't foresee at that time that the priority options  
13 would have the capability and the potential to create  
14 surplus, and so the strategy did not address the issue  
15 of managing the surplus in that circumstance.

16 Our illustrative surplus management does  
17 tend to follow the priority strategic directions in a  
18 reverse order of which ones do you cut out first in  
19 surplus management.

20 [4:20 p.m.]

21 Again, another example, the seventh one,  
22 life extension, and that is consistent with the spirit  
23 of the strategic direction that will maintain and  
24 improve the existing committed facilities.

25 And we also have a specific strategy,

1 5.5.2, which says rehabilitation or redevelopment of  
2 existing facilities should be addressed along with  
3 other demand and supply options. An area where we have  
4 made some changes again in response to current  
5 circumstances is with respect to managing uncertainty.  
6 And our approach currently has the name, for want of a  
7 better, of planning around the median.

8 And this is a different way of managing  
9 uncertainty to implement strategy 2.2.4 which says:

10 Preparations for demand and supply  
11 options will be undertaken in time to  
12 meet the upper load projection while  
13 avoiding the cost of premature  
14 commitment.

15 And we will discuss this further later in  
16 our evidence.

17 Another area of change, which is the  
18 ninth one, is with respect to single unit nuclear  
19 stations. The strategy was concerned with the balance  
20 between the economies of scale of large multi-unit  
21 stations and the relative inflexibility that comes from  
22 planning with large multi-unit generating stations.

23 Element 5.3 of the strategy states:

24 Single or two-unit commitment of  
25 economically sized units and multi-unit

1 stations will be considered to maintain  
2 flexibility.

3 The CANDU 6 single units that we have  
4 relied upon as one of the potential major supply  
5 options when major supply is required have been costed  
6 based on the economies of several units on one site,  
7 which is consistent with the thrust of the strategy.

8 THE CHAIRMAN: Sorry, what was the number  
9 of that strategy?

10 MR. SNELSON: Element 5.3.

11 THE CHAIRMAN: And this is all taken from  
12 Exhibit 74; is that right?

13 MR. SNELSON: That's correct.

14 And the strategy elements are also in  
15 appendix A, I believe, to Exhibit 3, but without the  
16 rationale.

17 THE CHAIRMAN: All right.

18 MR. SNELSON: The last example is with  
19 respect to environmental controls on existing plant  
20 where we are now planning on a higher level of control  
21 with lower emissions.

22 And this intended to better regulation or  
23 to anticipate regulation, and that is consistent with  
24 strategy is 1.4 which says in part:

25 Ontario Hydro will take a leadership

1                   role in protecting the environment.

2                   So I think when you examine the  
3                   circumstances that have changed, you can see while not  
4                   all of them were foreseen in the strategy, they are all  
5                   of them generally consistent with the strategy.

6                   MR. B. CAMPBELL: Q. I would like to  
7                   turn then to you, Ms. Howes, and deal with  
8                   environmental considerations and have you explain,  
9                   please, how environmental considerations were included  
10                  in the principles set out in the demand/supply strategy  
11                  that has been described by Mr. Snelson.

12                  MS. HOWES: Yes, they were and I am  
13                  specifically referring to Exhibit 53 and that's  
14                  entitled: Meeting Future Energy Needs Environmental  
15                  Impacts. And that's the document which addresses the  
16                  environmental issues addressed in the demand/supply  
17                  strategy that Mr. Snelson referred to.

18                  Q. Can you outline, please, what were  
19                  the natural environmental criteria used to evaluate  
20                  plans consistent with the criteria used in the  
21                  demand/supply planning strategy documentation.

22                  A. Those were the criteria I mentioned  
23                  this morning when I was discussing the option of  
24                  comparison, the same criteria.

25                  Q. How were those criteria used?

1                   A. The criteria were used to evaluate  
2 each of the plans and to establish on a relative basis  
3 the environmental advantages and disadvantages of each  
4 of the plans. There was however no attempt to rank the  
5 plans.

6                   Q. Were full life cycle effects  
7 addressed in the natural environment analysis?

8                   A. To the extent that there were  
9 quantitative data available and that the data  
10 influenced the comparison across the plans, yes, life  
11 cycle effects were addressed. The extent to which life  
12 cycle effects were addressed are described in Exhibit  
13 4, pages 3-3 and 3-4.

14                  Q. We have heard throughout the hearing  
15 from time to time some discussion of concept of  
16 sustainable development. Was that concept considered  
17 in the planning process?

18                  A. Yes, it was. Hydro tries to consider  
19 the concept of sustainable development in its  
20 activities including planning. Ontario Hydro accepts  
21 the concept of sustainable development as defined by  
22 the World Commission on Environment and Development  
23 known as the Brundtland Commission. And if I could  
24 quote:

25                               Economic development which meets the



1 needs of the present generation without  
2 compromising the ability of future  
3 generations to meet their needs.

4 Hydro recognizes too that sustainable  
5 development is an evolving process and it requires a  
6 long-term focus and it's really a vision of what we  
7 want to be in the future. Hydro recognizes that there  
8 is no one preferred energy future and that all forms of  
9 energy production have environmental effects and that  
10 low energy futures are preferred.

11 Q. Can you illustrate please how this  
12 concept of sustainable development is reflected in the  
13 planning process.

14 A. Yes. It was addressed through first  
15 an emphasis on energy efficiency and energy  
16 conservation, which is consistent with a low energy  
17 future. Secondly, through improving the efficiency of  
18 the existing system through life extension of the  
19 fossil system. Third, through encouraging the use of  
20 renewable resources, and I am specifically referring to  
21 the Manitoba Purchase, the hydraulic plan, and  
22 preference for renewable NUGs, and the R&D work on  
23 alternative energy technologies. Fourth, by  
24 identifying adverse environmental effects and  
25 developing appropriate mitigation measures. And fifth,

1 by working with individuals, organizations and  
2 communities which have a stake in our plans.

3 Q. Again another phrase that we have  
4 heard from time to time throughout these proceedings is  
5 cumulative effects. And I would ask you whether in  
6 your judgment in the planning process for environmental  
7 effects, has an effort been made to evaluate the  
8 cumulative effects of the plans that are now before the  
9 Board?

10 A. Yes. In an attempt to identify and  
11 evaluate the cumulative and environmental effects, we  
12 did two things. First, we identified or estimated the  
13 total resource use, the total emissions, the total  
14 effluents and wastes over the planning period. We also  
15 presented the data on a per terawatthour basis so that  
16 we could look at the trends over the planning period.

17 And the second thing that we did was that  
18 we compared our expected emissions and certain other  
19 environmental criteria against anticipated future  
20 regulation, where they existed, and this was as a proxy  
21 for determining acceptable environmental performance.

22 And what we assumed was that  
23 environmental regulations were set in Ontario with a  
24 view to limiting emissions and wastes to levels that  
25 would have acceptable cumulative effects on the

1 environment within the province.

2 Q. Now would it be fair to conclude from  
3 that that a full cumulative impact assessment was done  
4 for each of the plans?

5 A. I would have to say yes and no. I  
6 would say yes because we looked at the environmental  
7 effects over time and tried to determine their  
8 acceptability by comparing emissions, et cetera,  
9 against expected future environmental regulations.

10 But I would have to say no because our  
11 work was not comprehensive enough to be called a  
12 complete cumulative effects assessment, but I think our  
13 work reflects the current state of the art. We are  
14 struggling, as other practitioners of environmental  
15 impact assessment, to try and get a handle on  
16 appropriate definitions and techniques for cumulative  
17 effects assessments.

18 Q. In your judgment what are the issues  
19 which have yet to be resolved with respect to that body  
20 of work that is known as cumulative effects assessment.

21 A. Because I understand that some of  
22 this was discussed in Panel 6, I will only focus on  
23 certain of the important problems I think are  
24 associated with cumulative effects assessments. The  
25 first is how to collect and manage the data necessary

1 to establish a baseline environment and to monitor  
2 effects.

3 The second would be trying to determine  
4 what are the bounds for such an assessment, how big an  
5 area should we consider, what length of a time frame  
6 should be considered.

7 The third area is how to determine and  
8 factor in carrying capacity and threshold limits.

9 THE CHAIRMAN: Sorry, I didn't get that.  
10 Can I have that again, please.

11 MS. HOWES: How to determine and factor  
12 in carrying capacity and threshold limits.

13 THE CHAIRMAN: Carrying capacity?

14 MS. HOWES: Carrying capacities.

15 MR. B. CAMPBELL: Q. What do you mean by  
16 that term?

17 MS. HOWES: A. In a general sense - how  
18 do I describe this? - the ability of the environment to  
19 sustain and respond to environmental stress, I would  
20 say is a definition of carrying capacity.

21 Shall I continue?

22 Q. Yes. You have a fourth item?

23 A. Yes. And that's what indicators and  
24 ecosystem components to study in order to monitor the  
25 effects.

1                   And fifth, what are the roles and  
2       responsibilities of various agencies and institutions  
3       in carrying out such assessments. So I would suggest  
4       that there is still a fair amount of uncertainty with  
5       respect to how and where cumulative effects assessments  
6       should be done, particularly in the context of resource  
7       planning.

8                   Q. Now is Ontario doing any research in  
9       this area?

10                  A. Yes, we are. We are currently  
11       involved with the Canadian Environmental Assessment  
12       Research Council in a multi-year study, which we expect  
13       to begin this year, to look at many of the questions  
14       that I just addressed.

15                  We are also sharing data with the private  
16       consortium composed of the Rawson Academy, The Canadian  
17       Arctic Resources Committee, and the community of  
18       Sanikilvaq, Northwest Territories, which is  
19       investigating the cumulative effects of development in  
20       the Hudson/James Bay bioregion. And we have committed  
21       to undertake cumulative effects assessment for the  
22       Moose River Basin hydroelectric development program as  
23       part of co-planning with Aboriginal groups and northern  
24       stakeholders.

25                  Q. Now, I would like then to ask you to



1 or I guess ask you whether there have been any changes  
2 in the planning process for the natural environment  
3 since the 1989 Demand/Supply Plan was produced?

4 A. I would have to say that there were  
5 no changes in the planning process but certainly there  
6 have been changes to the context within which we are  
7 planning.

8 Q. Could you describe these changes in  
9 context, please.

10 A. While we considered environmental  
11 factors in future regulations in 1989, I would have to  
12 say that in the Update, which is Exhibit 452, we are  
13 more explicit on how Ontario Hydro will respond to a  
14 fuller range of environmental regulations. Specific  
15 controls, emission controls were noted and were costed.

16 I think, too, we have an increased  
17 knowledge about the environmental control technologies,  
18 what they can and cannot do for us, so we have an  
19 increased focus on emission controls in the Update and  
20 I think the same can be true about our knowledge of  
21 alternative technologies.

22 Also since 1989, I think it's fair to  
23 state that there has been an increase in public  
24 expectation with respect to Ontario Hydro's  
25 environmental performance and we have reflected that in

1 our plans. As well, our senior management is more  
2 committed to anticipating and planning for  
3 environmental legislation in advance of the regulation.

4 Q. I want to turn then next to you, Dr.  
5 Tennyson, in the social environment area, and ask you  
6 again to give us an overview of how the social  
7 environment is incorporated in the planning process.

8 DR. TENNYSON: A. Social environmental  
9 considerations are incorporated throughout the planning  
10 process. They have been important considerations in  
11 the development of the demand/supply options study, the  
12 draft demand/supply planning strategy, the  
13 demand/supply planning strategy, the Demand/Supply  
14 Plan, and the Update.

15 Also as indicated earlier, social  
16 environmental criteria were developed and used to  
17 analyze the options and cases. It should also be  
18 emphasized that the public input was instrumental in  
19 the development of all these studies and the social  
20 environmental criteria and analyses which captured the  
21 identified concerns.

22 The direct evidence for Panel 6 outlined  
23 the various opportunities for public and government  
24 review of the options study, the draft demand/supply  
25 planning strategy and the demand/supply planning

1 strategy. The results of these reviews were used in  
2 the development of the Demand/Supply Plan.

3 I would now like to describe the  
4 Demand/Supply Plan public feedback program, beginning  
5 with its objectives and activities. The Demand/Supply  
6 Plan feedback program which began in January 1990 had a  
7 number of objectives. One, to provide an opportunity  
8 for interested groups and individuals to review and  
9 comment on the Plan. Two, to inform key publics about  
10 all major components of the Demand/Supply Plan as well  
11 as the planning and review processes.

12 Three, to establish communication with  
13 groups and individuals likely to be involved in the  
14 formal review process. And four, to report to senior  
15 management on public comments and the issues and  
16 concerns identified through the public feedback  
17 program.

18 The Demand/Supply Plan public feedback  
19 program activities are described in chapter 4, pages 19  
20 to 25 of Exhibit 535. Some of these activities were as  
21 follows: 70 information centres were held throughout  
22 the province; approximately 10,000 people attended the  
23 centres and about 3,350 questionnaires were filled out.

24 In addition, there were many  
25 presentations made to provincially based organizations

1 from our head office in Toronto. The Region's branch  
2 made numerous presentations throughout the province to  
3 a total audience of 25,000. Also information was  
4 provided to the public through approximately a  
5 million-and-a-half municipal utility bill inserts and a  
6 further 850,000 Ontario Hydro bill inserts. There was  
7 also a number of public communications activities  
8 including speakers bureau presentations with a total  
9 audience of 21,000. And there was also many  
10 information centres in over 20 locations in the  
11 province.

12 For the Aboriginal communities  
13 specifically, of course there were the information  
14 centres in the North and there was also one in the  
15 community of Moose Factory. There have also been  
16 numerous meetings in the context of site and  
17 route-specific environmental assessment studies. And  
18 we also had the DSP communications materials translated  
19 into Ojibway, Oji-Cree and Cree.

20 Q. What have been some of the key  
21 findings from that feedback program?

22 A. These findings are found once again  
23 in Exhibit 535, chapter 5, pages 26 to 32.

24 As I indicated earlier, public support  
25 for aggressive demand management and environmental

1 protection is stronger than ever. With respect to  
2 demand management, however, there is the need for  
3 greater customer awareness of and opportunities for  
4 demand management. In addition, there are conflicting  
5 views as to whether demand management targets are too  
6 low or too high.

7 As indicated in the options comparison,  
8 non-utility generation is considered an acceptable  
9 supply option by the public. For alternative energy,  
10 there is public support for future research and  
11 development into alternative supply technologies. As  
12 indicated earlier, there exists the perception that  
13 hydraulic generation is less environmentally damaging  
14 than other supply options.

15 The need for a reliable source of  
16 electricity is still a priority for many and that  
17 reasonably priced reliable electricity is important for  
18 the provincial economy.

19 [4:40 p.m.]

20 As indicated in the options comparison  
21 discussed earlier in my direct evidence, nuclear energy  
22 remains controversial largely because of waste disposal  
23 and safety issues, and there is a growing concern over  
24 fossil fuel because of greenhouse gas and acid gas  
25 issues and concern about global warming. As a result,



1 the nuclear option is seen by the public to have some  
2 advantage over fossil in this respect. However,  
3 natural gas is preferred over oil and coal for fossil  
4 fuel generation.

5 In general, the environmental impacts of  
6 all supply options are growing issues. The natural  
7 environmental and social impacts of new facilities  
8 particularly for Aboriginal communities are of concern,  
9 and when planning generating facilities cost  
10 considerations should be balanced with environmental  
11 considerations.

12 There is also the view that the planning  
13 and approval processes for both the Demand/Supply Plan  
14 and new facilities should be open to public and  
15 government input and review. And finally, there  
16 continues to be interest in Ontario Hydro's debt load.

17 Q. All right. What did those findings  
18 suggest to Ontario Hydro with respect to the 1989  
19 Demand/Supply Plan?

20 A. The results suggest that Ontario  
21 Hydro should encourage demand management, maximize  
22 demand management before commitment to new supply,  
23 protect the environment, put more emphasis on  
24 non-utility generation, and place greater emphasis on  
25 the development and use of alternative technologies.

1 Q. And in your judgment are the changes  
2 that have been made in the update consistent with these  
3 conclusions from the feedback program?

4 A. Yes, I would say that they are  
5 definitely consistent. They are greater in some areas  
6 than in others, obviously with demand management and  
7 non-utility generation, but I believe we are moving in  
8 this direction as well with alternative technologies.

9 Q. All right. Dr. Long, I would like  
10 then to switch gears, turn to you, and you have  
11 indicated that the assessment of the impact on  
12 financial results is generally concerned with total  
13 plans rather than specific options. I would ask you to  
14 outline now, please, generally for the Board, what that  
15 kind of plan assessment involves from a financial  
16 viewpoint.

17 DR. LONG: A. Yes. Corporate financial  
18 assessments basically involve a simulation of the  
19 Corporation's financial results. These simulations are  
20 based on the assumptions underlying each of the plans  
21 under consideration, and as well they are based on the  
22 Corporation's financial policies. The projected  
23 results in which we are most interested are in three  
24 areas, the first is financial performance, the second  
25 is electricity rates, and the third is borrowing.

1                   The results in each of these areas are  
2                   assessed using judgment and as well they are assessed  
3                   against certain benchmarks, and this information is  
4                   part of the package that's provided to Hydro's senior  
5                   management and the Board of Directors in their  
6                   consideration of demand/supply plans.

7                   Q. Now, I would like you to deal with  
8                   each of these one at a time. Could you explain,  
9                   please, why financial performance is important and how  
10                  considerations of financial performance enter into the  
11                  overall assessment of plant?

12                 A. Good financial performance for Hydro  
13                 means achieving the revenue necessary to cover all of  
14                 our costs, as well as achieving an adequate level of  
15                 net income.

16                 An adequate level of net income is one  
17                 which is sufficient to maintain assurance that our debt  
18                 will be viewed as self-sustaining, and that we will  
19                 therefore not represent a burden on the province which  
20                 guarantees our debt. This is important because it  
21                 contribute to ensuring that Hydro has access to capital  
22                 at competitive rates.

23                 The assessments of financial performance  
24                 as far as the projections that have been included in  
25                 our assessments of demand/supply plans is really not an

1 issue because those projections have been developed on  
2 the basis of achieving the acceptable long-term  
3 targeted performance as per Hydro's net income policy,  
4 and that means an interest coverage in the range of 1.2  
5 to 1.3.

6 Q. So I take it that all of your  
7 analyses start from that point, they assume that  
8 acceptable financial performance through that kind of  
9 interest coverage will be achieved?

10 A. That's correct. And that's over the  
11 long-term.

12 Q. All right. The second item you  
13 mentioned was rates, and again if you could just  
14 indicate briefly how they enter into the assessment.

15 A. First of all, why rates are  
16 important, they are important because there are a key  
17 concern of our customers, and as such, they factor in  
18 to a corporate objective as well as being part of the  
19 set of criteria for the demand/supply strategy, that is  
20 the low long-term cost to customers.

21 In assessing rates we look at the level  
22 and trend in the rate outlook, and our traditional  
23 benchmark for this assessment has been inflation. And  
24 while this is expected to continue to be an important  
25 comparison, because of the changes in our business,

1 especially with respect to demand management which has  
2 an emphasis not on minimizing rates but on maximizing  
3 value, we are considering other benchmarks such as  
4 rates in other jurisdictions.

5 Q. And the third item you mentioned was  
6 borrowing. Again, can you just briefly deal with why  
7 it's an important factor in the comparison of plans and  
8 how that borrowing consideration enters into the  
9 assessment?

10 A. An assessment that borrowing is  
11 important because we need assurance that our plans are  
12 capable of being financed.

13 The business that Hydro is in places a  
14 significant reliance on debt financing, and the  
15 rationale for this, which I discussed somewhat in my  
16 evidence on options, mentioned that that was because of  
17 the matching of costs and benefits.

18 The use of borrowing allows for the  
19 equitable allocation of cost of facilities amongst  
20 those customers that benefit.

21 I mentioned also that Hydro only has two  
22 source of funds. If facilities are not financed  
23 through borrowing then they must be financed through  
24 rates. This would be unfair to current customers if  
25 the facility being financed is one which will provide



1 benefit for many years.

2 In assessing borrowing requirements of  
3 the plans we look at the level of those requirements,  
4 and these are assessed by our treasury staff on the  
5 ability of the company to meet those requirements  
6 especially in traditional markets, and this involves a  
7 comparison to current and past levels of borrowings  
8 that have been successfully managed.

9 Q. Dr. Long, I would like to turn now to  
10 Mr. Shalaby and deal with some technical and system  
11 planning considerations.

12 We have talked variously about strategy,  
13 environmental considerations, socio-economic and  
14 financial considerations. I would ask you, in turning  
15 to some of what I will call the system planning  
16 aspects, to have you, Mr. Shalaby, give us a sense of  
17 what system planners take into consideration when they  
18 put together an integrated plan.

19 MR. SHALABY: A. In addition to the  
20 demand/supply planning criteria that Mr. Snelson talked  
21 about, there are various important considerations that  
22 we rely on formulating integrated plans.

23 We keep in mind the customer use pattern,  
24 time-of-use and place of use, and so on. We keep in  
25 mind that demand can be higher or lower than what we

1 expect as captured by the bandwidth forecasts that I  
2 described earlier today. We keep in mind that we are  
3 adding to an existing system. So the characteristics  
4 and the base that we are building on is very important  
5 to keep in consideration when we are adding to it.

6 We keep in mind the need for reserve  
7 margins to maintain reliability. We observe the option  
8 lead times in expanding the capability of the system,  
9 we observe limitations imposed by lead time.

10 We keep an eye on oil and gas  
11 consumption. It's a resource that's somewhat new to us  
12 in terms of use for generation of electricity and we  
13 had considerations to do sustainability and depletion.  
14 So we keep an eye on that.

15 We watch for environmental regulations,  
16 requirements, ensure that our plans conform to the  
17 regulatory requirements and anticipate those that we  
18 can anticipate.

19 We look at the diversity both in energy  
20 and in capacity. We look at siting considerations and  
21 we look at bulk transmission considerations.

22 Mr. Campbell, I prepared a brief 15  
23 minute dissertation on each of these items, but given  
24 the level of excitement in the room and the time of  
25 day, maybe I will refer you to Exhibit 3, Exhibit 6 and

1 Exhibit 66 for extensive discussions on these factors.

2 Q. All right. Now, perhaps having now  
3 turned many pages of my book, I think while it's clear  
4 from the list that you have described, is it fair to  
5 say that this is not something about which you can take  
6 a step by step straight line walk through it which  
7 leads inevitably to only one reasonable conclusion;  
8 would that be fair?

9 A. It is fair to say that this is not a  
10 step by step process and that planning is a dynamic and  
11 iterative process. And I guess the chairman confirmed  
12 that as well this afternoon, so I don't have to go on a  
13 hard sell on this item here.

14 I think the hearing itself has shown us  
15 the nature of planning, the updating of data, the  
16 changing in forecasts, the changing in the weights and  
17 circumstances that are involved in balancing all the  
18 criteria that we work with.

19 We need to continuously balance  
20 objectives that are at times conflicting, and we need  
21 to make decisions sometimes soon or right away, and  
22 some other decisions we need to make later. And as Mr.  
23 Snelson indicated, prudent planning is to defer  
24 decisions to the just-in-time kind of approach where  
25 you make them only when necessary.

1                   And for that reason you will find us  
2           using the word "illustrative" to describe things like  
3           the management of the surplus, and things like the  
4           response portfolio.

5                   And even the major supply capacity post  
6           2005 or 2010 we show illustrative examples of that.  
7           The reason we call them illustrative is that we  
8           recognize that other options could become available and  
9           perhaps there would be better choices available to us.  
10          So it really is applying the just-in-time decisions  
11          that we use the illustrative to describe some of the  
12          aspects of our planning.

13                   Q. Now, having recognized that it is not  
14          a straight line walk-through all of this, I take it,  
15          however, that the planning process does address or does  
16          try to address all of the various factors in a  
17          systematic way.

18                   A. That is correct. And I would like to  
19          refer to a couple of figures. Figure 19 that's now on  
20          the board, which is a reproduction of figure 15-2 of  
21          Exhibit 3, shows schematically what formulation of a  
22          major supply plan looks like. I don't intend to go  
23          through the steps rigorously other than to show that we  
24          start with a wide range of options, we formulate a  
25          large number of cases, and then we iterate and evaluate

1 and eventually distill our information into a smaller  
2 number of cases that we present, for example, to a  
3 board of inquiry like this one or to our senior  
4 management for discussion.

5 The next page which is figure 20, shows  
6 something similar but now not just for major supply,  
7 but for the entire demand/supply planning process.  
8 This is also out of Exhibit 3 and it is figure 2-1.  
9 Again, I will not go through all the details of the  
10 process other than to observe the feedback loops on  
11 prices and rates on avoided cost, the different places  
12 that non-utility generation plugs into the process.

13 So this is just an indication of the  
14 continuous and iterative nature any planning cycle can  
15 take.

16 The information we produce is reviewed by  
17 many groups within the organization, the assumptions  
18 and issues are discussed with our senior management and  
19 the cases are tested and the process continues until a  
20 small number is selected and seen to be acceptable and  
21 therefore gets documented in exhibits like Exhibit 3  
22 and Exhibit 452. Those exhibits, along with many  
23 others and along with the testimony of our witness  
24 panels, summarize the considerations that we take into  
25 account and document the process and the results that



1 we come to.

2 That formulation process whether depicted  
3 by any of these graphs or by the testimony that we give  
4 here should be seen in the context of a strategy that  
5 Mr. Snelson gave, the policy direction that we receive  
6 and the constraints and objectives of the organization.

7 Q. All right. Now, taking as a given  
8 that the process isn't simply linear, start here end  
9 there, I will ask you though in a somewhat simplistic  
10 way to recap what you see as the major steps that you  
11 move through as you put together an integrated plan?

12 A. Well, the steps that we go through in  
13 a nutshell again follow the process that you have  
14 received our testimony so far, and that is we project  
15 the demand for our product into the future, we project  
16 the capability of our system into the future, and that  
17 creates the demand/supply requirements gap that Mr.  
18 Snelson presented earlier this morning.

19 We then see to it what extent the  
20 priority options can fulfil that gap. And in an  
21 attempt to fill the gap beyond the priority options, if  
22 the priority options do not do the whole job, we  
23 characterize the various supply options, we look at  
24 their cost, their environmental impacts, and technical  
25 soundness and many other features and formulate

1 alternative demand/supply plans that fulfil the  
2 requirements of our customers.

3 We evaluate, we iterate and re-evaluate  
4 and we focus at the end on a small number of  
5 alternatives that we present for further discussion and  
6 for further description.

7 So, that in a nutshell is the linear  
8 process that we presented our case through here. But I  
9 would like to indicate that the complexity increases  
10 tremendously when uncertainties are introduced into  
11 that process.

12 Q. All right. And can you give some  
13 examples of the type of uncertainties that are  
14 typically considered as you move through that process,  
15 and I am asking here not for any extension discussion,  
16 but just basically for a list of the kinds of things  
17 that you have to have worry about in this uncertainty  
18 area?

19 A. Some of the uncertainties we face, we  
20 have heard about again through our testimony, the load  
21 forecasts, fuel prices, inflation rates, interest  
22 rates, changes in social values and priorities,  
23 achievement of demand management targets, changes in  
24 government policies and priorities. So these are a few  
25 of the uncertainties that we go through. Again, I will

1 spare everybody my 15-minute dissertation on every  
2 item.

3 THE CHAIRMAN: I expect you will get a  
4 chance to give a dissertation in the next few weeks.

5 MR. SHALABY: Okay. [Laughter]

6 MR. B. CAMPBELL: Q. Now, in light of  
7 these uncertainties that affect planning, can you  
8 enumerate some measures, some of the kinds of measures  
9 you consider that contribute to managing these  
10 uncertainties?

11 MR. SHALABY: A. Some of the measures  
12 that we discuss in our exhibits and throughout our  
13 testimony include the diversity and primary energy  
14 sources and the different designs of our plants, the  
15 different geographical location of our plants. So  
16 diversity is a source of flexibility for us.

17 Reserve margins that Panel 2 discussed  
18 provides a cushion or a flexibility measure to absorb  
19 uncertainties in the short-term.

20 The strong transmission network that we  
21 have built over the last 70 or 80 years, and that  
22 includes interconnections to neighbouring utilities in  
23 the United States and Canada is a major source of  
24 flexibility in wheeling energy from one power plant to  
25 another location in the province.

1 [4:55 p.m.]

2 Our ability to match demand management  
3 and NUGs to customer needs could provide a significant  
4 source of flexibility for us. And of course the  
5 ability to add supply, new supply, provides a large  
6 measure of flexibility for a utility, particularly if  
7 that new supply can be put in a short lead time.

8 Some of these flexibility measures are  
9 already in place such as the transmission network, the  
10 diversity and so on, and some others we continue to  
11 work on and build over the next period of time.

12 Q. Now, against that, how do you go  
13 about deciding if you have provided sufficient  
14 flexibility to manage future uncertainty in a  
15 reasonable way?

16 A. Well, I think flexibility as must be  
17 obvious comes at a cost. Therefore, the decisions have  
18 to do with how much flexibility is appropriate, how  
19 much is enough. And judgment in balancing the costs of  
20 that flexibility versus its benefits is really what  
21 comes into the planning process here, and that's really  
22 the business of the company on a day-to-day basis is  
23 balancing the cost of measures versus their benefit.

24 Some of the uncertainties that we face  
25 can be more appropriately analyzed analytically. For

1 example, the impact of equipment failure or of  
2 different fuel prices or interest rates can be analyzed  
3 in an analytical way to a large measure. For example,  
4 we showed you reliability assessments to account for  
5 equipment failure and many other technical matters. We  
6 included in our exhibit sensitivity studies to show the  
7 impact of higher fuel prices or lower interest rates or  
8 different information assumptions.

9 We included probabilistic analyses that  
10 would determine the expected value given that we don't  
11 know exactly where variables are going to end up. We  
12 showed you the impact of different parameters and  
13 showed probability distributions for costs and so on.  
14 So those are measures that are appropriately dealt with  
15 in analytical fashion.

16 But we recognize that quantitative  
17 analytical methods have their limitations and we  
18 recognize that many other areas have to be dealt with  
19 in a judgmental way rather than in an analytical way.  
20 And examples of uncertainties that must be dealt with  
21 in a judgmental way would include changes in social  
22 values, for example, or expected changes in regulatory  
23 and environmental regulations. So, those are areas  
24 that number crunching would not help us at all.

25 So the combination of the two, judgment



1 and analytical techniques, help us understand whether  
2 flexibility is being provided sufficiently or not.

3 Q. And how at the end of the day do you,  
4 do you go about making a decision as to whether a plan  
5 has enough flexibility?

6 A. We look at the result of the various  
7 analytical results that we have; we rely on the  
8 experience we gained from previous work; and we apply  
9 judgment to all of that to make that kind of  
10 determination. Again this is not a single input/single  
11 output kind of equation. It's a process that has got  
12 human judgment applied to it.

13 In a way we can think of it similar to  
14 the decisions many of us make about coverage and  
15 insurance. We try to cover some contingencies but not  
16 all contingencies, and that is certainly our objective  
17 in Hydro as well. The goal is not to seek coverage for  
18 every possible uncertainty and contingency, but we  
19 would like to be comfortable that we can mitigate the  
20 impact of the likely, some of the more likely  
21 contingencies.

22 And for a detailed discussion of some of  
23 the considerations we take into account, Exhibit 3,  
24 chapters 15 and 17, discuss some of the reasons we were  
25 satisfied and the plans we formulated in 1989 had

1 sufficient flexibility in them. And similar  
2 discussions could be applied to the plans that we  
3 submitted in Exhibit 452.

4 And more details, Mr. Dalziel here will  
5 be describing, for example, how a response to the upper  
6 load forecast can be achieved under the current  
7 circumstances. So this is a sneak preview for  
8 tomorrow's program for those of you who have to come  
9 back tomorrow.

10 Q. Are there considerations for  
11 flexibility, are these concerns different in the 1992  
12 Update?

13 A. Mr. Snelson indicated that there are  
14 differences in managing uncertainty. And perhaps I  
15 would like to dwell first on the similarities in  
16 managing uncertainty. I think we can make a big story  
17 about the differences, but let's not forget that the  
18 majority of the management of uncertainty  
19 considerations are similar today to the time of the  
20 original Demand/Supply Plan. So, the goals of  
21 uncertainty management are the same.

22 The uncertainties themselves are quite  
23 similar: load forecast, fuel prices, interest rates.  
24 The things that we want to guard against are the same  
25 kind of uncertainties out there. The measures we use

1 are in the most part the same, and I described some of  
2 those. The notable difference is that we are not now  
3 seeking approvals for the need and rationale of all the  
4 supply facilities needed to meeting the upper load  
5 growth. That is the item in the portfolio that we are  
6 not utilizing at this time. So that is the difference  
7 in managing the uncertainty now from 1989.

8 Q. And my last question to you today is  
9 really to ask you what are the main reasons for that  
10 change. Can you give us just a brief introduction to  
11 the reasons as to why you are not now seeking approvals  
12 for major supply that would provide you with full  
13 coverage all the way to the upper load forecast?

14 A. In a nutshell because the approvals  
15 that we will seek to cover the upper will not be needed  
16 until much later for the median. And that was not the  
17 case in 1989. In 1989, a major supply facility that  
18 was needed in 2002 under the upper would have been  
19 needed in 2003 under the median. So the facility would  
20 have been used very soon afterwards under the median  
21 forecast. It would have been used not too long after  
22 that under the lower load forecast, 2008 I think it  
23 was.

24 So in 1989 a facility that we sought  
25 approval for now would have been used in a window of

1 six or seven years. Today the situation is very  
2 different. A facility that would be needed in the  
3 upper, around 2001, would be needed almost seven or  
4 eight years later under the median and will not be  
5 needed at all during the planning horizon under the  
6 lower. So, the facility will not be used in a small  
7 window as it would have been in 1989. Again, Mr.  
8 Dalziel will be showing more details and more graphical  
9 presentation of this factor tomorrow.

10 Another factor for not seeking all the  
11 approvals at this time is the availability of  
12 sufficient measures in our response portfolio. We  
13 mentioned the availability of natural gas options that  
14 can be put in place in a short lead time. Non-utility  
15 generation is now considered to be a major source of  
16 flexibility. And that certainly is a picture that  
17 wasn't seen in 1989 to the same extent.

18 So in the circumstances we find ourselves  
19 in right now, Mr. Campbell, we don't believe that we  
20 diminished our capability to respond to the upper  
21 growth and we will provide evidence to that tomorrow as  
22 well. We haven't diminished our capability without all  
23 the approvals to meet the upper. And again I would  
24 like to remind ourselves that we are seeking approvals  
25 for a significant amount of supply facilities in the

1 Manitoba transmission and the hydraulic program.

2 [5:09 p.m.]

3 MR. B. CAMPBELL: Thank you, Mr.  
4 Chairman. We went a little bit past five, but this  
5 would be a convenient time for a break.

6 THE CHAIRMAN: Tomorrow we will stop at  
7 twelve noon and come back at two o'clock. So for those  
8 of you who will be making plans, that's the way we are  
9 going to do it tomorrow, and we will not be sitting on  
10 Thursday.

11 MR. B. CAMPBELL: Would the Board  
12 entertain a motion to start at 9:30 tomorrow?

13 THE CHAIRMAN: I don't think we ever save  
14 any time, perhaps in this exercise we do, but it never  
15 seems to work.

16 MR. B. CAMPBELL: Your comment in that  
17 respect was that cross-examinations expand to fill the  
18 time. I can assure you that there is no intent on my  
19 part to expand the direct to fill the time available.  
20 There is an overweening desire to get it finished  
21 tomorrow.

22 THE CHAIRMAN: Well, on the basis of the  
23 unanimous consent of those present, we will start at  
24 9:30. Is that satisfactory?

25 9:30 tomorrow morning.



1 THE REGISTRAR: Please come to order.

2 This hearing will adjourn until 9:30 tomorrow morning

3 ---Whereupon the hearing was adjourned at 5:10 p.m., to  
4 be reconvened on Wednesday, May 20, 1992, at  
5 9:30 a.m.

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